SALMON FISHERIES IN THE YUKON AREA, ALASKA 1992

A Report to the Alaska Board of Fisheries

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Table of Contents

INTRODUCTION

The Yukon Area includes all waters of the Yukon River drainage in Alaska and coastal waters from Canal Point Light, near Cape Stephens, to the Naskonat Peninsula. Subsistence fishing occurs throughout most of the Yukon River drainage. Commercial salmon fishing occurs along the entire 1,200 mile length of the mainstem Yukon River in Alaska, and in the lower 220 miles of the Tanana River. For management purposes, the area is divided into six districts and 10 subdistricts (Figure 1). The Lower Yukon Area (Districts 1, 2, and 3) includes the coastal waters of the delta and that portion of the drainage from the mouth to Old Paradise Village (river mile 301). The Upper Yukon Area (Districts 4, 5, and 6) is that portion of the drainage upstream of Old Paradise Village to the US/Canada border, including the Tanana River. Salmon fisheries also occur in Canada, with fishery management activities conducted by the Canadian department of Fisheries and Oceans (DFO).

Five species of Pacific salmon occur in the Yukon River, with chum salmon being the most abundant. The chum salmon return is made up of an early (summer chum salmon) run and a later (fall chum salmon) run. Pink salmon are abundant only in even-numbered years (i.e., 1988, 1990, 1992...). Exploitation of pink salmon in both commercial and subsistence fisheries is very low due to their advanced stage of maturity, and the presence of other, more desirable species. Sockeye salmon are rare in the drainage. Chinook and summer chum salmon generally begin entering the river during late May or early June. The chinook salmon migration has usually passed through the lower river by the first week of July, while the summer chum salmon migration usually continues until mid-July. Fall chum salmon generally begin entry into the Yukon River by the middle of July and are present into September. Coho salmon generally begin entering the river during the first week of August with entry continuing into September.

DESCRIPTION OF FISHERIES, MANAGEMENT, AND REGULATIONS

Management of the Yukon River commercial salmon fishery is complex because of the difficulty in determining run size, harvesting of mixed stocks, increasing efficiency of the commercial fleet, and allocation issues. The overall goal of the department's research and management program is to manage the various salmon runs for optimum sustained yield under the policies set forth by the Alaska Board of Fisheries. However, escapement levels required to produce maximum sustained yields cannot be determined at this time due to the lack of an adequate database. Current escapement objectives in the Yukon River drainage are based on historic escapement trends in key spawning index areas which are surveyed or counted annually. In most cases, the average historic escapement level for each index area is considered a minimum escapement objective to be met or exceeded each season.

Due to the mixed stock nature of the fishery, some tributary populations may be under- or over harvested in relation to their actual abundance. Based on current knowledge, it is impossible to manage individual stocks independently, and there is concern that some spawning populations may be reduced to very low levels.

Research and management projects are underway, and additional studies are planned, should additional funding become available, to obtain the biological information necessary for more precise management of the salmon runs. Current projects include: chinook salmon stock identification studies using scale pattern analysis (SPA), chum salmon stock identification studies using genetic stock identification (GSI) techniques, main river sonar operation (near Pilot Station) to obtain estimates of total Yukon River salmon abundance, monitoring spawning escapements in various locations, and test fishing in the Yukon River delta area and in the Tanana River to provide inseason run timing and relative abundance information.

Commercial Fishery

Commercial chinook salmon fishing in the Alaskan portion of the Yukon River dates back to 1918, but the multi-species salmon fishery did not become fully developed until the mid-1970s. During the 1970s, fishing time was liberal with relatively low effort levels. In more recent years, commercial fishing time has been greatly reduced due to the increased efficiency of the fleet.

There are two fishing seasons in the Yukon Area: the early or summer season which targets chinook and summer chum salmon, and the late or fall season which targets fall chum salmon, with an incidental harvest of coho salmon.

Legal commercial fishing gear consists of set and drift gillnets in the Lower Yukon Area, and fish wheels and set gillnets in the Upper Yukon Area. Open skiffs powered by outboard motors are typically used to operate fishing gear and to deliver fish to tenders or buying stations. Separate limited entry permits have been issued for the Upper and Lower Yukon Areas, and are not transferable between areas. There are 716 limited entry permits issued for the Lower Yukon Area, and 235 limited entry permits issued for the Upper Yukon Area.

Important regulations for management include guideline harvest ranges (Table 1), established by the Alaska Board of Fisheries, and emergency orders, which are used to open and close the commercial fishing seasons, establish fishing period frequency and duration, and establish mesh size restrictions. Harvests near the midpoint of the guideline harvest ranges should be expected if the run is of average magnitude. In general, based upon evaluation of run abundance, the department attempts to manage the commercial fisheries such that each district's harvest is proportionately similar within their respective guideline harvest ranges.

Chinook Salmon

A guideline harvest range of 60,000-120,000 chinook salmon has been established for Districts 1 and 2 combined, and a guideline harvest range of 1,800-2,200 chinook salmon has been established for District 3. Individual chinook salmon guideline harvest ranges are in effect for each Upper Yukon Area district or subdistricts with a combined harvest range of 5,550-6,950 fish (Table 1). The Lower Yukon Area early season commercial fishery is opened after it has been determined, by monitoring test fishing and subsistence catches, that a sustained migration of chinook salmon is in progress, and that the early portion of the chinook salmon run has passed through the lower river.

Summer Chum

A river-wide guideline harvest range of 400,000-1,200,000 summer chum salmon was established by the Board of Fisheries in February 1990 (Table 1). This overall guideline was further distributed by district and subdistrict based on the average harvest shares from 1975 to 1989. In District 4, summer chum salmon roe is the primary product. Relatively poor flesh quality and high costs of transportation have combined to minimize the export of summer chum salmon from this district. However, summer chum salmon harvested in this district produce a very high quality caviar. The largest summer chum salmon harvest in District 4 occurs in Subdistrict 4-A. The guideline harvest range for Subdistrict 4-A is 113,000-338,000 summer chum salmon, or the equivalent roe poundage of 61,000-183,000 pounds of roe, or some combination of fish and pounds of roe. By regulation, no more than 183,000 pounds of summer chum roe may be sold annually. However, if the roe cap is reached in Subdistrict 4-A, regulation allows the sale of fish in-the-round only. In an effort to improve harvest estimates, all salmon caught by CFEC permit holders during commercial periods in Subdistrict 4-A must be reported on fish tickets.

Management of the summer chum salmon fishery in the Lower Yukon Area is greatly dependent on actions taken for chinook salmon because of the overlapping run timing of both species. Prior to the 1985 season, mesh size restrictions (six-inch maximum mesh size) were implemented to direct the harvest toward summer chum salmon only after most of the chinook salmon harvest goal had been achieved. Since 1985, during years of high summer chum salmon abundance and early run timing, restricted mesh size periods have been implemented prior to or between chinook salmon directed fishing periods (unrestricted mesh size) to harvest summer chum salmon.

Fall Chum and Coho Salmon

The current guideline harvest ranges of 60,000-220,000 fall chum for the Lower Yukon Area and 12,750-100,500 fall chum and coho salmon combined for the Upper Yukon Area were established in February 1990 (Table 1). No guideline harvest range for coho salmon has been established for the Lower Yukon Area. Coho salmon harvests are dependent on management actions taken for fall chum salmon. In all districts, fishing frequency and duration is dependent on the department's perception of the strength of the fall chum salmon run.

The Board of Fisheries adopted a salmon management plan for District 6, the Tanana River, in May 1988. Commercial and subsistence fishing time was reduced from two 48-hour periods per week to two 42-hour periods per week. However, it was specified that there be no more than one 42-hour commercial fishing period per week during the fall season. Management of the District 6 commercial fishery is based on existing guideline harvest ranges (Table 1), although, the harvest ranges may be exceeded if it can be determined inseason that doing so will not jeopardize escapement requirements or subsistence needs. The department has only limited tools and databases to assess the Tanana River salmon run strength inseason, therefore, management must be conservative in this fishery. Prior to the 1990 season, the Subdistrict 6-A commercial fishing schedule was reduced to no more than one 24-hour period per week during the fall fishing season. This change was an attempt by the Board of Fisheries to increase fall chum spawning escapement to the Toklat River.

Subsistence Fishery

Subsistence salmon fishing in the Yukon River drainage has a long history. Excluding the greater Fairbanks area (population 74,031 in 1990), some 40 communities, with a total population of approximately 11,000 people of primarily Yupik Eskimo and Athabaskan Indian descent, are located within the area. Approximately 1,500 households harvest salmon for subsistence use in the drainage.

Subsistence salmon fishing occurs from late May through October, although this varies throughout the drainage. Fishing activities are based either from a fish camp or home village. However, the degree to which one or the other is more prevalent varies from community to community. Some people from communities not situated along the Yukon River, such as Birch Creek, Venetie, and some residents of Chalkyitsik, operate fish camps along the Yukon River. Subsistence salmon fishing is often undertaken by extended family groups representing two or more households in a community. These groups, as well as members of individual households, cooperate to harvest, cut, dry, smoke, and store salmon for subsistence use. Many people who fish for subsistence salmon also operate as commercial fishermen.

Subsistence has been designated by the legislature as the highest priority among beneficial uses of fish resources. In major commercial fishing areas, it is necessary to place some restrictions on the subsistence fishery in order to enforce commercial fishing regulations. During the fishing season, however, substantially more fishing time is allowed for subsistence than for commercial purposes. In general, since the early 1960s subsistence fishing has been managed and regulated to coincide with commercial salmon fishing periods when the commercial fishing season is open. During the commercial salmon season, additional subsistence only fishing time is allowed. For example, regulations require 24-hour subsistence only fishing periods to be established by emergency order every other weekend during the summer commercial fishing season, and every weekend during the fall commercial fishing season in the Lower Yukon Area. Prior to and following the commercial fishing season, subsistence fishing is allowed seven days per week in Districts 1 through 5, and for two 42-hour periods per week in District 6.

Subsistence fishing permits are required in three areas within the upper Yukon drainage: (1) the entire Tanana River drainage; (2) the Yukon River between Hess Creek and Dall River; and (3) the Yukon River between the upstream mouth of Twenty-two Mile Slough and the U.S./Canada border. Additionally, in District 6, there are harvest limits and reporting requirements.

In February 1990, the Alaska Board of Fisheries closed the lower Kantishna River and Toklat River to subsistence fishing for fall chum salmon in order to rebuild the Toklat River spawning stock. However, subsequent decisions issued by the Alaska Superior Court provided for subsistence fishing to resume on those river systems in 1991 due to injunctive relief. In February 1992, the Board allowed subsistence fishing in these rivers, but only with fish wheels equipped with liveboxes, and all chum salmon must be returned alive to the water.

Gillnets, beach seines, and fish wheels are legal gear for subsistence fishing in the Yukon Area. The use of driftnets for subsistence fishing has been limited, by regulation, to the Lower Yukon Area and to a section of Subdistrict 4-A. In the Lower Yukon Area, set and drift gillnets are the predominant gear types, and in the Upper Yukon Area, primarily fish wheels and setnets are used for subsistence fishing.

Subsistence salmon harvest data has been collected through the use of personal interviews, permit reports, and catch calendars since 1961. Through this period, survey methods and harvest reporting have varied. Canadian non-commercial harvest information is collected by the Canadian Department of Fisheries and Oceans (DFO).

In the Subdistrict 4-A summer chum salmon commercial fishery, fishermen extract and sell roe from their catch and retain the carcasses for subsistence use. During the 1980 to 1985 period, it is likely that many fishermen reported a portion of their commercial harvest as subsistence fish. It is probable that the unmarketable commercial product may have simply replaced a large portion of the subsistence harvest in this area. Since 1986, subsistence surveys for the Yukon River drainage were conducted in such a manner as to estimate the number of summer chum salmon taken by commercially related activities and those taken by traditional subsistence fishing activities.

Estimates of the 1991 subsistence harvest in the Alaska portion of the Yukon River drainage totaled 46,773 chinook, 118,540 summer chum, 145,524 fall chum, and 37,388 coho salmon (Tables 2 and 3). These estimates do not include commercially caught summer chum salmon retained for subsistence purposes in District 4. There were an estimated 996 dogs kept by fishing households in the Lower Yukon Area and 5,587 dogs kept by fishing households in the Upper Yukon Area.

Chinook salmon are utilized mainly for human consumption. However, while chum and coho salmon are also used for human consumption, large numbers are also taken to feed sled dogs. The practice of keeping sled dogs is much more prevalent in the Upper Yukon Area and it is considered a major factor affecting subsistence use.

Preliminary estimates for the 1992 subsistence harvest in the Alaskan portion of the Yukon River drainage should be available by the end of February, 1992.

Personal Use Fisheries

Regulations were in effect from 1988 until July 1, 1990 that prohibited non-rural residents from participating in subsistence fishing. In those years, non-rural residents harvested salmon under personal use fishing regulations. The Alaska Supreme Court ruled, effective July 1990, that every resident of the State of Alaska was an eligible subsistence user, making the personal use category obsolete. Since July 1, 1990, all Alaskan residents qualify as subsistence users. In 1990, a total of 222 personal-use permits were issued in the Yukon Area. Since the 1990 season, no personal use permits have been issued.

Sport Fisheries

In general, sport fish salmon harvests in the Yukon Area are relatively minor compared to commercial and subsistence harvests. The Tanana River drainage is the exception, as it supports a popular sport fishery. In 1988, the Board of Fisheries established a guideline harvest range of 300-700 chinook salmon for the Salcha River recreational fishery. In 1990, the Board established a guideline harvest range of 300-600 chinook salmon for the Chena River recreational fishery.

U.S./Canada Treaty Negotiations

Negotiations were initiated in 1985 between the U.S. and Canada regarding a Yukon River salmon treaty. Substantial progress has been made to date on several issues, but some important issues remain to be settled.

A six-year stabilization program, ending after the 1995 season, has been agreed to for chinook salmon in the mainstem Yukon River in Canada. The objective of the program is to stabilize the stock by achieving a spawning escapement of 18,000 or more chinook salmon for each year through 1995. This stabilization spawning objective was established to prevent any further decrease in chinook salmon escapements. During the stabilization period, Canada will manage all of its chinook salmon fisheries on the mainstem Yukon River within a guideline harvest range of 16,800 in years of weak returns to 19,800 in years of strong returns.

The management agencies are to develop a chinook salmon rebuilding program to begin in 1996 for the purpose of achieving a more optimal spawning escapement level in the future. The Joint Technical Committee (JTC), made up of Canadian and Alaskan fisheries biologists, has recommended a spawning escapement objective of 33,000 to 43,000 chinook salmon as the long term goal of a rebuilding program.

Both countries have agreed to a twelve-year rebuilding program, ending after the 2001 season, for fall chum salmon in the mainstem Yukon River in Canada. The objective of the program is to rebuild the stock by achieving a spawning escapement of 80,000 or more fall chum salmon for all brood years by the year 2001. The program will endeavor to rebuild the stronger brood years in one cycle and the weaker brood years in three cycles in equal increments.

During the rebuilding program, Canada will manage all fall chum salmon fisheries on the mainstem Yukon River in Canada within a guideline harvest range of 23,600 in years of weak returns to 32,600 in years of strong returns. The U.S. will endeavor to deliver to the Canadian border on the mainstem Yukon River, the number of chum salmon necessary to meet the spawning escapement objective for that year in the rebuilding program, and provide for a harvest in Canada within the guideline harvest range. Specific border passage ranges agreed to for 1992 through 1995 are:

1992	74,600-112,600
1993	74,600-112,600
1994	84,600-112,600
1995	103,600-112,600

For the remaining years in the plan thereafter, the U.S. will endeavor to deliver annually between 88,600 and 112,600 chum salmon to the Canadian border.

The two countries agreed not to initiate new fisheries on the Porcupine River for an eight-year period and to consider rebuilding and improving management of Canadian Porcupine River fall chum stocks.

The latest round of negotiations was held in Whitehorse, Yukon Territory, Canada during November 9-13, 1992. Current U.S. and Canada negotiating positions on harvest shares after rebuilding and deeming are quite far apart. Deeming refers to the determination of entitlements each country has to salmon spawned in Canadian portions of the Yukon River. The two countries have been discussing the establishment of a restoration and enhancement fund. Such a fund would be used to help restore and enhance Yukon River salmon stocks through cooperative programs.

COMMERCIAL SEASON SUMMARY, 1992

Commercial sales totaled 474,835 salmon and 120,646 pounds of unprocessed salmon roe for the Alaskan portion of the Yukon River drainage in 1992. Total sales were composed of 120,245 chinook, 332,313 summer chum, 15,721 fall chum, and 6,556 coho salmon sold in the round (Table 4). Additionally, roe sales by species totaled 3,164 pounds for chinook, 112,996 pounds for summer chum, 2,806 pounds for fall chum, and 1,680 pounds for coho salmon. The total estimated commercial salmon harvest includes the estimated number of females harvested to produce roe sold and the number of salmon sold in the round. In Subdistrict 4-A, the estimated number of male summer chum salmon harvested to produce roe sold are also included in the total estimated commercial harvest. The 1992 estimated salmon catches compared to the 1987 through 1991 five year average were as follows: chinook, 12% above (Table 5); summer chum salmon, 45% below (Table 6); fall chum salmon, 88 % below (Table 7), and coho salmon, 87 % below (Table 8).

Yukon River fishermen in Alaska received an estimated $11.3 million for their catch, approximately 17% above the recent 5-year average. Five buyer-processors operated in the Lower Yukon Area, and 11 buyer-processors and 12 catcher-sellers operated in the Upper Yukon Area.

Lower Yukon fishermen received an estimated average price per pound of $4.12 for chinook and $0.27 for summer chum salmon. Ex-vessel value of the Lower Yukon Area fishery was $10.6 million. The average income for the 679 Lower Yukon Area fishermen (95 percent of the total permit holders issued for the area) that participated in the 1992 fishery was $15,558.

Upper Yukon commercial fishermen received an estimated average price per pound of $0.91 for chinook salmon, $2.82 for chinook salmon roe, $0.30 for summer chum salmon, $4.53 for summer chum salmon roe, $0.39 for fall chum salmon, $4.50 for fall chum salmon roe, $0.39 for coho salmon, and $2.18 for coho salmon roe. The Upper Yukon Area's value of the fishery for the fishermen was $0.8 million. The average income for the 143 upper Yukon fishermen (61% of the total permit holders issued for the area) who participated in the 1992 fishery was $5,375.

A new regulation was adopted by the Board of Fisheries in February 1992, which required fishermen to report the number of salmon caught but not sold during commercial fishing periods on fish tickets. An estimated 60 chinook, 2,873 summer chum and 19 pink salmon were caught but not sold during commercial fishing periods in the Lower Yukon Area in 1992. Minimum numbers of salmon were also reported as caught but not sold during commercial fishing periods in the Upper Yukon Area. Overall, compliance with this new regulation appeared to be poor and the estimates are conservative. The majority of the fish caught but not sold were of poor commercial quality.

Chinook Salmon

According to historical test fishing data, the chinook salmon run into the lower river appeared to be late, compressed, and above average as compared with prior years. The mainstem Yukon River was generally free of ice by 3 June. However, coastal waters remained ice covered until 10 June. The first chinook salmon catches were reported on 13 June near Sheldons Point by a subsistence fisherman. The department's test fishing project near Emmonak recorded the first chinook salmon on 14 June. Chinook salmon entry was primarily through the south and middle mouths of the Yukon River based on commercial and test net catches.

Test fishing catches at Big Eddy and Middle mouth indicated chinook abundance and run timing were most similar to the 1984 and 1985 runs. Approximately 50% of the chinook salmon run had entered the lower river by 28 June based upon test fishing data. Due to difficulties with one of the set net sites, it was subjectively determined postseason that chinook salmon catches may have been biased low early in the season through 27 July, and may have been biased high from 28 June through 5 July.

Due to ice conditions along the coast, the chinook salmon run was late and compressed, with test fishing catches increasing very rapidly compared to other years. Therefore, the commercial salmon fishing season was opened by emergency order after approximately six days of increasing subsistence and test net catches in the lower Yukon River. The chinook salmon directed fishery was opened on a staggered basis: 20 June in District 1, 22 June in District 2, and 1 July in District 3. All subsequent fishing periods were established by emergency order. The first commercial fishing period in Districts 1 and 2 was 6 hours in duration, which is the shortest unrestricted mesh size period ever to open the season. Because of the compressed nature of the run, and high efficiency of the fleet, no subsequent fishing periods were allowed to exceed 12 hours in duration.

The total District 1 and 2 chinook salmon harvest was 112,351 fish, 6% below the upper end of the guideline harvest range for the two districts and 15% above the 1987-1991 average harvest. The harvest includes an estimated 2,206 chinook salmon which a buyer did not report inseason. A portion of the unreported harvest (781 chinook) was entered into the fish ticket database as the harvests appeared to have occurred during established fishing periods with the fish tickets not turned in by the processor. The remainder of the unreported harvest appeared to have occurred during subsistence fishing periods and is reported by district as unlawful purchases.

Approximately 75% of the chinook salmon harvest in Districts 1 and 2 combined was taken during unrestricted mesh size fishing periods. Unrestricted mesh size fishing periods were allowed in four out of eight fishing periods in District 1, and four out of seven fishing periods in District 2. The overall average weight of chinook salmon was 21.5 pounds. The average weight of chinook salmon harvested during unrestricted mesh size and restricted mesh size fishing periods was 22.5 and 16.7 pounds, respectively. Age composition samples from the commercial fishery indicated that age-6 fish accounted for the majority of the catch.

Normally, 24-hour subsistence only fishing periods are established by emergency order every other weekend during the summer season in Districts 1 and 2. Additional subsistence only fishing periods were allowed this year due to the compressed entry pattern of the salmon run, and to examine how short subsistence only fishing periods in between scheduled commercial fishing periods would work. On Tuesday 23 June and 30 June, 12-hour and 6-hour subsistence only fishing periods were established in Districts 1 and 2, respectively. Overall, it appeared that these fishing periods worked out very well, although some fishermen were concerned about the possibility of illegal sales of subsistence caught fish. A total of 28 drifters and 5 set nets were observed on an aerial survey flown during the first District 2 subsistence only period on 23 June, which appeared to be a fairly large amount of effort.

In District 3, three unrestricted mesh size fishing periods (one 12-hour, one 9-hour, and one 6-hour) were allowed. The initial delay in opening District 3 allowed the first segment of the chinook salmon return to pass through the district prior to the commercial fishery. A total of 1,819 chinook salmon were harvested in District 3, which was essentially equal to the lower end of the guideline harvest range of 1,800 fish, and 10% above the recent five-year-average.

Virtually all of the District 4 chinook salmon commercial harvest is taken in Subdistricts 4-B and 4-C (Figure 1). The commercial fishing season opened on 5 July, which was later than normal due to the late migratory timing of chinook salmon. District 4 fishermen sold 1,651 chinook salmon and 2,273 pounds of chinook salmon roe, for an estimated 2,394 fish commercial harvest. This harvest was slightly above the lower end of the District 4 guideline harvest range.

In District 5, chinook salmon is the primary species of commercial value during the early season. The commercial fishing season was opened in Subdistricts 5-A, 5-B, and 5-C on 10 July when it was estimated that the chinook salmon run was well distributed throughout the subdistricts. Two fishing periods (one 48-hour and one 24-hour) occurred in Subdistricts 5-A, 5-B, and 5-C. Approximately 2,000 chinook salmon were harvested during the first period (48 hours). A second period of 24 hours duration was allowed to obtain a harvest within the guideline harvest range. Catch rates were higher than expected during the last period, and the total estimated harvest was 3,398 chinook salmon for Subdistricts 5-A, 5-B, and 5-C. This harvest was 598 fish over the upper end of the guideline harvest range of 2,800 fish. One 42-hour fishing period was allowed in Subdistrict 5-D and 457 chinook salmon were harvested, which was within the 300 to 500 guideline harvest range.

In District 6, the chinook salmon harvest is largely incidental to the summer chum salmon fishery due to the low harvest guideline for chinook salmon (600-800 fish). The first 42-hour fishing period occurred on 20 July, and fishermen harvested 719 chinook salmon. The next commercial fishing period was delayed because preliminary escapement information indicated less than desired numbers of chinook salmon in the Chena and Salcha River index areas. At this time sport fishing for salmon was closed in the Tanana River drainage, and one subsistence fishing period in Subdistricts 6-A and 6-B was canceled, as were two subsistence periods in Subdistrict 6-C. The second and last early season commercial fishing period was allowed in Subdistricts 6-A and 6-B on 3 August with the harvest directed toward the later running summer chum salmon. Subdistrict 6-C remained closed to allow additional chinook salmon in the upper portion of the drainage to reach the spawning grounds. Commercial sales totalled 572 chinook salmon and 884 pounds of chinook salmon roe, for an estimated harvest of 752 fish.

Summer Chum Salmon

Similar to the chinook salmon migration, the majority of the summer chum salmon run entered the river through the south and middle mouths of the Yukon River. Comparative test net catches indicated that the 1992 summer chum salmon run was below average in abundance and similar to the 1990 and 1991 runs. Summer chum salmon catches were relatively strong in the test fishery from 16 June through 26 June. Approximately 50% of the summer chum salmon run had entered the lower river by 23 June according to test fishing catch per unit effort (CPUE) data.

Preliminary age composition information from Districts 1 and 2 indicated that the commercial catch was composed primarily of age-5 fish, with age-6 fish comprising a larger proportion of the catch than normal, and age-4 fish accounting for a much smaller proportion than normal. The average weight of summer chum salmon in the lower river commercial catch was 6.9 pounds.

The total District 1 and 2 summer chum salmon commercial harvest of 324,458 fish was 45% below the recent 5-year average, and at the 15% point within the guideline harvest range of 251,000-755,000 fish. The harvest includes an estimated 1,499 summer chum salmon which a buyer did not report inseason. A portion of the unreported harvest (1,377 chum salmon) was entered into the fish ticket database as the harvests appeared to have occurred during established fishing periods with the fish tickets not turned in by the processor. Approximately 75% of the summer chum salmon harvest in Districts 1 and 2 was taken during fishing periods restricted to six inch maximum mesh size gillnets. A total of four restricted mesh size periods were allowed in District 1 and three restricted mesh size periods in District 2.

There were no restricted mesh size fishing periods in District 3. A total of 65 summer chum salmon were sold from three unrestricted mesh size fishing periods in District 3. Poor quality of summer chum salmon and market conditions were factors in the low harvest, which was well below the low end of the guideline harvest range for this district.

In District 4, the season opened on 5 July. Fishing periods in Subdistrict 4-A were limited to 24 hours in duration, while Subdistricts 4-B and 4-C remained on the customary 48-hour fishing periods. The 24-hour periods in Subdistrict 4-A allowed better fishery monitoring and a more equitable distribution of the harvest throughout the run. Subdistrict 4-A fishermen sold 99,701 pounds of summer chum roe. No fish were purchased in the round in Subdistrict 4-A. The department estimated postseason that 184,171 male and female summer chum salmon were harvested to produce the roe sold in Subdistrict 4-A. The total estimated harvest was at the 32% point within the guideline harvest range and exceeded the targeted quarter-point (25% point) of the harvest range of 113,000-338,000 summer chum salmon.

Subdistricts 4-B and 4-C fished six periods and sold 2,659 summer chum salmon and 11,108 pounds of roe for an estimated harvest of 15,177 summer chum salmon, which was below the low end of the guideline harvest range of 16,000-47,000 fish. The estimated harvest in Subdistricts 4-B and 4-C only includes fish sold in the round and the estimated number of females caught to produce roe sold. However, the guideline harvest range was calculated using estimates of incidental males also harvested to produce roe sold. The commercial fishing season was closed on 25 July based on the cumulative harvest, decreasing catches, and preliminary information which indicated poor chinook and summer chum salmon escapements.

In District 5, summer chum salmon do not contribute substantially to the commercial harvest because of the timing of the fishery, lower availability, poor flesh quality, and the high transportation costs to the market. A total of 102 summer chum salmon and 295 pounds of roe were sold. The District 5 summer chum salmon harvest in 1992 was estimated to be 430 fish. This harvest was well below the District 5 guideline harvest range of 1,000 to 3,000 summer chum salmon.

In District 6, commercial fishing time was limited to two 42-hour periods in Subdistricts 6-A and 6-B and one 42-hour period in Subdistrict 6-C due to concerns for achieving adequate chinook and summer chum salmon escapements. A total of 5,029 summer chum salmon and 1,892 pounds of roe were sold, for an estimated total commercial harvest of 7,228 summer chum salmon, which was below the guideline harvest range of 13,000 to 38,000 summer chum salmon.

Fall Chum and Coho Salmon

A below average run of fall chum salmon was expected in 1992 based upon evaluation of parent year escapements. Expectations were for a very limited commercial harvest, if any commercial fishery were to be allowed at all. Because the 1988 parent year escapements were relatively good only in the upper Tanana River, the greatest likelihood for a commercial fishery to be allowed in 1992 was in the upper portion of the Tanana River (Subdistricts 6-B and 6-C). Subdistrict 4-A, by regulation, does not have a fall chum salmon commercial season.

Since the Yukon sonar project at Pilot Station was not fully operational in 1992, only daily lower Yukon River test fishing catches were monitored to assess run strength. The management strategy involved comparing the inseason cumulative test fish CPUE with the overall average cumulative CPUE for 1980-1991. It was planned to make a determination of whether to reopen the lower river commercial fishery or not by approximately 4 August. The fishery would remain closed if the test fish CPUE was below the overall average CPUE.

Fall chum salmon migratory timing into the lower river appeared to be average, however the run appeared to be much more compressed than normal. There was one major pulse of fall chum salmon which entered the Yukon River between 4 August and 7 August. Comparative lower Yukon River test fishing data indicated that the 1992 fall chum salmon run was below average in abundance, and similar to the 1988 and 1990 runs. Test fishing data indicated the coho salmon run was above average in magnitude and average in run timing.

The Yukon River (Districts 1 through 5) and lower Tanana River (Subdistrict 6-A) were not opened to commercial fishing during the fall season in 1992 due to below average fall chum salmon abundance and the need to improve spawning escapements for most stocks from the parent year levels. However, a commercial fall season commercial salmon fishery was allowed in Subdistricts 6-B and 6-C in the Tanana River, which are upstream from the Kantishna and Toklat Rivers.

Based on catches in test fish wheels and in the commercial and subsistence fishery, and preliminary age composition, the overall fall chum salmon run in the upper Tanana River was assessed to be about average in strength. Two commercial fishing periods were allowed in Subdistricts 6-B and 6-C. There was one 42-hour period beginning on 7 September, and one 24-hour period beginning on 18 September. A total of 15,721 fall chum salmon, 2,806 pounds of fall chum roe, 6,556 coho salmon, and 1,680 pounds of coho roe were sold. The estimated total commercial harvest was 19,022 fall chum and 7,979 coho salmon. The combined estimated commercial harvest of 27,001 fall chum and coho salmon exceeded the upper end of the District 6 guideline harvest range of 20,500 fall chum and coho salmon combined by 32%. However, the fall chum and coho salmon harvests were 68% and 28% lower than the recent five-year average, respectively.

Enforcement

FWP began an investigation several months prior to the commercial fishing season when information was received that Schenk Seafood Sales Inc. was purchasing subsistence caught chinook salmon on the lower Yukon River. On June 30, 1992 fourteen troopers from the Statewide Investigations Section, and one Alaska State Trooper from St. Mary's served a search warrant in the office aboard the processing vessel Fort Yukon and boarded several Schenk tenders.

Troopers discovered records on the Fort Yukon indicating that Schenk Seafood Sales had purchased subsistence caught salmon from several fisherman. A number of fish tickets had also been discovered that were not turned in to ADF&G within the required 48 hour reporting period.

Upon these discoveries FWP broadened the scope of the warrant to include all records of the Schenk operation for the 1991 and 1992 fishing seasons. The investigation revealed that Schenk was purchasing illegally taken chinook and chum salmon from area fishermen. This scheme was known as "custom freeze" by Schenk employees. It was also discovered that Schenk was not withholding child support payments as required by the Department of Revenue. Fish purchased illegally were not reported to the Department of Fish and Game.

The seized records indicated that Schenk Seafood Sales Inc. purchased a total of 75,219 pounds of chinook salmon and 15,236 pounds of chum salmon in 1991 and 51,111 pounds of chinook salmon and 11,187 pounds of chum salmon in 1992 which were not reported to ADF&G. The value of the fish to Schenk was in excess of $687,000.

On August 26, 1992, Mr. L. George Schenk plead no contest to thirty misdemeanor counts of commercial fishing violations relating to unlawful purchases of salmon on the Lower Yukon River in 1991 and 1992. Mr. Schenk was sentenced to a $400,000 fine with $350,000 suspended, with $50,000 to pay. He was also sentenced to serve one year in jail with six months suspended. Mr. Schenk was placed on probation for three years and was ordered not to participate in any commercial fisheries related activity in the State of Alaska and to have no violation of statutes or regulation related to commercial fishing.

On July 21, 1992, Mr. Schenk entered into a civil settlement agreement with the State of Alaska. Mr. Schenk agreed to pay the State $900,000 in civil settlement for fish and game violations and an additional 50,000 to the Alaska Department of Revenue, Child Support Enforcement Division for violations of child support withholding regulations. Mr. Schenk agreed to sell all of his processing equipment and tendering fleet. However, he could not do so in the time allowed and the State of Alaska seized all of his equipment and fleet. The cases of four fishermen involved in illegal fish sales have been adjudicated and approximately five more cases are pending.

Regulatory Proposals

Several regulatory proposals to prevent sales of subsistence caught salmon in the Lower Yukon Area were discussed at a fishermen's meeting held in St. Mary's on 24 July and at a Lower Yukon Fish and Game Advisory Committee meeting held in Alakanuk on 11 December. There were three major proposals supported by the fishermen and the department: 1) require immediate dorsal fin clips on subsistence caught chinook salmon, 2) separate commercial and subsistence fishing periods, and 3) require marking of commercial fishing vessels in some manner (such as with CFEC permit numbers or ADF&G numbers).

In addition, there are 25 deferred subsistence regulatory proposals to be addressed by the Board of Fisheries which involve fishing seasons and periods, legal gear, permit requirements, and marking requirements. Also, in response to board findings in March, 1992, the Yukon River Drainage Fisheries Association in a joint effort with the department will be providing management options for rebuilding the Toklat River fall chum salmon stock for consideration by the board.

Canadian Fisheries, 1992

Management plans for the Canadian chinook and chum salmon fisheries on the Yukon River in 1992 were formulated to reflect the understandings reached during U.S./Canada negotiations. Most of the commercial harvest on the mainstem Yukon River near Dawson is taken in set gillnets. However, beginning in 1991, more fish wheels have been used to harvest chum salmon. Harvests within the Canadian portion of the Porcupine River drainage is currently limited to an Indian Food Fish fishery.

Chinook Salmon

Prior to the 1992 commercial fishing season, the commercial guideline harvest for chinook salmon was set at 8,600 to 11,600 fish with a preseason target of 9,400 fish. The preliminary commercial harvest was 10,806 chinook salmon (Table 9). Indian Food Fish, Domestic, and Sport fisheries harvests in 1992 are not yet available. The preliminary 1992 mainstem Yukon River border passage estimate for chinook salmon, was 39,000 fish.

Fall Chum Salmon

Prior to the 1992 commercial fishing season, the commercial guideline harvest for fall chum salmon was set at 20,900-29,900 chum salmon with a preseason target of 20,900 fish in view of a below average expected run. The preliminary 1992 commercial harvest was 18,599 chum salmon (Table 10). Indian Food Fish, Domestic, and Sport fisheries harvests in 1992 are not yet available. The preliminary border passage estimate for fall chum salmon was 68,000 fish.

STATUS OF STOCKS AND FISHERY

The Yukon River sonar project at Pilot Station has estimated daily passage of migrating salmon for six years (1986-1991). In 1992 the sonar project did not operate. There were two reasons for the reduction in operation in 1992. First, the department purchased new sonar equipment, which was not received until after the season. The new equipment may enable the department to obtain more accurate counts of migrating salmon. Second, the department explored the possibility of moving the sonar site slightly downstream of the present location. It is expected that the sonar project will return to full operation in 1993. Annual estimates of salmon passage for prior years are presented in Table 11.

Chinook Salmon

Commercial chinook salmon catches in the Alaskan portion of the Yukon River drainage have shown a decreasing trend. The recent 5-year (1987-1991) average commercial harvest was 106,926 fish compared to the previous 5-year (1982-1996) average of 127,523 chinook salmon (Table 5). The majority of the commercial harvest occurs in Districts 1 and 2. The recent 5-year average chinook salmon subsistence harvest in Alaska was 49,743 fish, which was a 21% increase over the previous 5-year average of 41,015 chinook salmon (Table 12). During the period 1987-1991, approximately 65% of the annual subsistence harvest has occurred in the Upper Yukon Area. Total Canadian harvests have averaged 19,374 chinook salmon annually (1987-1991) (Table 9).

Chinook salmon spawning stocks are widely distributed throughout the Yukon River drainage. Analysis of chinook salmon scale patterns, age compositions, and geographic distribution of catches and escapements are used by the department to estimate geographic region of origin of the fishery harvests. Stock identification studies indicate that approximately 57% of the chinook salmon harvest in Alaska is spawned in Canada. Information acquired through scale pattern analysis (SPA), and tagging studies indicate that Canadian chinook salmon stocks have undergone unacceptably high harvest rates in recent years. Harvest rates were estimated to range from 69% to 91% in the 1980s. Based on studies in other areas, harvest rates in excess of 67% will likely result in a serious decline in chinook salmon abundance. Efforts to reduce this exploitation rate have resulted in increased Canadian mainstem Yukon River spawning escapements during the past five years compared to the period 1985 to 1987 (Table 13).

Due to the lack of reliable total population estimates, exploitation rates cannot be accurately estimated at this time for Alaskan chinook salmon stocks. Interim, minimum chinook salmon escapement objectives have been established by the department for eight Alaskan streams or index areas (Table 14). These escapement goals are based upon aerial survey index counts which do not represent total escapement. Aerial survey escapement data indicate that spawning escapement objectives for middle river stocks (primarily Tanana River drainage) have not been met during some recent years, however, escapement objectives for lower river stocks (Yukon River drainage below the Koyukuk River) have generally been achieved in recent years. It should be understood that caution must be used when comparing aerial survey results between years due to the variability inherent to this methodology.

Chinook salmon spawning escapements were variable in 1992 with escapements at or near objective levels in the lower river, but below objective levels for some of the stocks farther upriver (Table 14). Under poor aerial survey conditions, the East Fork Andreafsky River count of 1,030 chinook salmon was below the objective, and the West Fork Andreafsky River count of 2,002 chinook salmon was greater than the objective. The Anvik River was flown under fair survey conditions and 931 chinook salmon (above objective) were documented within the Anvik River index area. Aerial index counts of 348 and 231 chinook salmon in the North and South Fork Nulato Rivers, respectively, were well below objective levels in these streams. The Gisasa River aerial index count of 910 chinook salmon indicated the minimum objective was achieved.

Inseason assessment of chinook salmon escapement to the Tanana River drainage in 1992 was difficult due to inclement weather and turbid water conditions in the Chena and Salcha Rivers. The highest aerial survey count on the Chena River was obtained on August 11 after the peak spawning period. Only 825 chinook salmon were observed under poor to fair survey conditions, well below the escapement index objective of 1,700 fish. A poor to fair survey of the Salcha River, flown on August 3, resulted in an estimate of 1,484 chinook salmon, also below the objective escapement index of 2,500 fish. Additionally, tag and recapture projects were conducted by the Division of Sport Fish to estimate the total chinook salmon spawning populations in the Chena and Salcha Rivers. The 1992 estimates were 5,230 chinook salmon for the Chena River and 8,410 chinook salmon for the Salcha River. These estimates compare to the average total population estimates of approximately 5,000 for the Chena River and 5,800 for the Salcha River. However, the quality of the 1992 Chena River chinook salmon spawning escapement was poor due to less than average numbers of female fish.

The Canadian Department of Fisheries and Oceans (DFO) has conducted a tagging program on salmon stocks in the Canadian section of the drainage since 1982 (excluding 1984). The preliminary 1992 tagging estimate of total spawning escapement for the Canadian portion of the Yukon River drainage (excluding the Porcupine drainage) was 24,000 chinook salmon. This estimate falls short of the interim spawning escapement objective range of 33,000-43,000 chinook salmon, but is above the stabilization objective of 18,000 fish.

Summer Chum Salmon

Summer chum salmon commercial harvests have greatly increased during the past decade. The recent 5-year average (1987-1991) estimated commercial harvest was 974,227 fish (Table 6). The majority of the commercial harvest takes place in Districts 1 and 2 and Subdistrict 4-A. Approximately 166,916 summer chum salmon are taken annually (1987-1991 average) for subsistence use throughout the drainage (Table 12). The majority of the subsistence harvest occurs in the Upper Yukon Area.

The Andreafsky and Anvik Rivers are the major summer chum salmon-producing rivers (Table 15). Escapements of over one million summer chum salmon have been documented by sonar in the Anvik River. The Koyukuk, Nulato, and Tanana Rivers are also important summer chum salmon-producing systems. Summer chum salmon escapements in the Anvik River were above escapement objectives from 1988, 1989, and 1991, however, spawning escapements to other Yukon River tributaries, based on limited aerial survey information, generally appear to have been below desired levels from 1988 to 1991.

Interim minimum escapement goals for six major summer chum spawning streams in the lower and middle Yukon River drainage have been established (table 15). The Anvik River escapement objective is based on a sonar-enumeration estimate of the total escapement population. All other summer chum salmon escapement objectives are based upon historical averages of aerial survey index counts.

Escapement objectives were met in only one summer chum salmon stream throughout the entire drainage in 1992. The Anvik River escapement of 775,626 fish was 55% above the minimum escapement objective of 500,000 fish (Table 15). Aerial index counts of summer chum escapement to all remaining index streams were below objective levels. Index counts of only 11,308 and 37,808 summer chum salmon for the East Fork and West Fork of the Andreafsky River, respectively, suggested that chum salmon escapements were considerably below escapement objectives for these streams. However, poor survey conditions in the Andreafsky River because of large numbers of pink salmon observed in the lower one-quarter of each fork and excessive glare throughout most of the river hampered assessment.

Similarly, very poor index counts of summer chum salmon in the North Fork Nulato River, 9,857, Hogatza River, 2,986, were very poor, and accounts for less than 20% of the minimum escapement objective for each stream (Table 15).

Although summer chum salmon escapement to the Salcha River was slightly below the minimum objective of 3,500 fish, it is difficult to assess the quality of summer chum salmon escapement because of the great difficulty in seeing the salmon in that drainage, and the large area in which summer chum salmon are know to spawn. In 1992, the Division of Sport Fish made an attempt to estimate the total population of summer chum salmon spawners in both the Chena and Salcha Rivers using mark-and-recapture techniques. The preliminary total population estimates were 4,170 and 7,458 chum salmon in the Chena and Salcha Rivers, respectively.

Fall Chum Salmon

Commercial fall chum salmon catches in the Alaskan portion of the Yukon River drainage have shown a decreasing trend. The recent 5-year (1987-1991) average estimated commercial harvest of 162,541 fish is a reduction of approximately 30% compared to the previous 5-year (1982-1996) average of 230,700 fall chum salmon (Table 7, Figure 2). The majority of the commercial harvest occurs in Districts 1 and 2. The recent 5-year average fall chum salmon subsistence harvest in Alaska was 185,535 fish (excluding 115,829 fish involved in illegal sales in 1987), which was an increase over the previous 5-year average of 171,973 fall chum salmon (Table 12, Figure 2). During the period 1987-1991, approximately 90% of the annual reported subsistence harvest has occurred in the Upper Yukon Area (Table 16). Total Canadian fall chum salmon harvests have increased approximately 30% from an average of 26,121 fish annually (1982-1986) to 34,021 fish annually (1987-1991) (Table 10).

Major fall chum salmon spawning areas are located in the Tanana and Porcupine River drainages, and within the Canadian portion of the Yukon River drainage. Interim minimum escapement objectives for the Toklat, Delta, Sheenjek, and Fishing Branch Rivers are 11,000, 33,000, 64,000, and 50,000-120,000 fall chum salmon, respectively (Table 17). Unlike the chinook and summer chum salmon index objectives, the fall chum salmon interim minimum escapement objectives are based on estimates of total abundance. In addition, annual estimates of border passage and subsequent spawning escapement also exist for fall chum stocks in the Canadian portion of the upper mainstem Yukon River. The interim objective for the Canadian Yukon River mainstem stocks is for greater than 80,000 fall chum salmon spawners.

Historical tagging studies conducted near Galena and Ruby indicated that the early segment of fall chum salmon may be bound primarily for the Porcupine River and Canadian portion of the Yukon River. The later segment of the fall chum salmon run, although likely mixed with other stocks, is believed to be destined primarily for the Tanana River drainage. Stock identification studies, using protein genetics, are presently underway to improve our understanding of fall chum salmon timing by spawning stock, through the fisheries.

During the 1980s, there was concern for the health of fall chum salmon stocks because spawning escapements were below objective levels from 1982 through 1984 (Table 17, Figures 3 and 4). Additional regulatory restrictions adopted by the Board of Fisheries in 1983 and 1986 resulted in generally improved spawning escapements during the late 1980s. However, spawning populations in the Toklat River, Fishing Branch River, and the Yukon River mainstem in Canada have shown less improvement than other spawning areas. Therefore, over the next four year cycle, a continued reduction in fall chum harvests is believed to be necessary.

Overall, fall chum salmon escapements were below average in 1992, with escapement objectives being achieved in only one area. Escapements to the Porcupine River drainage was evaluated by observations made in the Sheenjek and Fishing Branch Rivers. The 1992 preliminary sonar estimate of approximately 79,315 fall chum salmon for the Sheenjek River was above the minimum escapement objective of 64,000 fish (Table 17). However, only 22,517 fall chum salmon passed through the Fishing Branch weir in 1992.

The Tanana River fall chum salmon escapement in 1992 was evaluated by foot surveys made in the Toklat and Delta River index areas. Total estimated escapement to the Toklat River was approximately 10,800 fall chum salmon; the lowest escapement for this river since 1982, and the second lowest on record. The Delta River fall chum salmon escapement estimate was approximately 8,900 fish, approximately 19% below the minimum objective of 11,000 fish. Although no escapement objectives exist for other fall chum salmon spawning areas in the upper Tanana River, escapement counts during peak spawning of approximately 3,600 and 1,200 fish, to Bluff Cabin and Clearwater Lake Outlet Sloughs (Big Delta region), respectively, indicated below average escapements. These numbers are approximately 25% lower than the recent ten-year average.

The preliminary fall chum salmon spawning population estimate made by DFO for the Canadian portion of the mainstem Yukon River in 1992 was approximately 47,000 fish. This escapement estimate was below the targeted minimum level of 51,000 fall chum salmon for 1992.

Although no fall commercial fishery was allowed in Districts 1-5 in 1992, spawning escapements were still below desired levels. It appeared that the production from the 1988 brood year was very poor based on the much lower than normal proportion of age-4 fall chum salmon in the 1992 run. The unusually cold winter of 1988-89 may have contributed to the poor return of age-4 fish in 1992.

Coho Salmon

Commercial coho salmon catches in the Alaskan portion of the Yukon River drainage have shown an increasing trend. Although there was no commercial fishery allowed in 1987, the recent 5-year (1987-1991) average commercial harvest of 63,168 fish was a 33% increase over the previous 5-year (1982-1996) average of 47,473 coho salmon (Table 8). Similarly, the recent 5-year average coho salmon subsistence harvest in Alaska of 48,891 fish (excluding 36,291 fish involved in illegal sales in 1987), was a 39% increase over the previous 5-year average of 35,108 coho salmon (Table 12). The majority of the reported subsistence harvest has occurred in the Upper Yukon Area.

Coho salmon escapement assessment is very limited in the Yukon River drainage due to funding limitations and survey conditions at that time of year. Most of the available information has been collected from the Tanana River drainage (Table 18). No interim escapement index objectives have been established for any area within the Yukon River drainage. Coho salmon escapements have increased during the past decade.

Based on assessment of the lower Yukon River test fishery of an above average coho salmon run, the relative magnitude of the few Tanana River escapements monitored in 1992 was much poorer than expected. The Division of Sport Fish boat survey count of coho salmon escapement in the Delta Clearwater River for 1992 was 3,963 fish, the lowest count since 1980.

OUTLOOK FOR 1993

Chinook Salmon

The majority of chinook salmon returning to the Yukon River are 6-year-old fish; however, 5- and 7-year-old fish make a significant contribution to the run. Spawning ground escapements in 1987, the primary brood year (age-6 in 1993), were judged to be below average in magnitude in Canada, and below average in the Tanana River in Alaska and above average in the lower river area. Survival and production of the 1987 brood year may be below average based on observations of a lower than normal contribution of 5-year-old fish to the 1992 commercial catch. It is expected that the return of 5-year-old fish in 1993 will be average in magnitude based on parent year escapements in 1988 and average proportion of 4-year-old fish observed in the 1992 run. The return of 7-year-old fish in 1993 (1986 year class) is expected to be above average, as the return of the 1986 year class in 1991 as 5-year-old fish and in 1992 as 6-year-old fish was above average. Overall, the 1993 chinook salmon run is anticipated to be slightly below average in strength. The commercial harvest in Alaska is expected to total 86,000-97,000 chinook salmon (80,000-90,000 fish in the Lower Yukon Area and 6,000-7,000 fish in the Upper Yukon Area).

Summer Chum Salmon

Summer chum salmon return primarily as 4-year-old fish, although substantial 5-year-old returns often result from brood years with high survival rates. The return of 4-year-old fish in 1993 will be dependent on production from the 1989 brood year and survival of the resulting cohort. In 1989, the summer chum salmon escapement was above the escapement objective for the Anvik River. No spawning escapement data are available for non-Anvik River summer chum salmon stocks in 1989. However, there has been a trend of lower than desired escapements in non-Anvik River stocks in recent years. The return of 5-year-old fish in 1993 is expected to be below average in strength based upon the below average return of 4-year-old fish in 1992. In summary, based on evaluation of brood year and assuming average survival, it is expected that the Yukon River summer chum salmon run in 1993 will be below average to average in magnitude. The Anvik River summer chum salmon stock is expected to be the primary contributor to the 1993 run. The commercial harvest is expected to be 400,000-800,000 fish. However, because of the mixed stock nature of the fishery, conservative management actions may be necessary to assure adequate escapements for non-Anvik River stocks.

Fall Chum Salmon

Similar to summer chum salmon, fall chum salmon return primarily as 4-year-old fish. Escapements in 1989 (the brood year which will produce 4-year-old fish in 1993) were average to above average, except for the mainstem Yukon River stock in Canada which was poor. The contribution of age-3 fall chum salmon in the 1991 return was near average which, when combined with available escapement data, suggests an average return of 4-year-old fish in 1993. The return of 5-year-old fish (1988 brood year) is expected to be below average based on the low contribution of age-4 fall chum salmon in the 1992 run, and the below average escapements in the majority of systems in 1988. In summary, based on evaluation of brood year escapements and assuming average survival rates, the overall fall chum salmon run is expected to be below average to average in abundance in 1993. The 1993 commercial harvest is expected to range from the lower end to the quarter-point of the guideline harvest range: 73,000 to 135,000 fish (approximately 60,000 to 100,000 fall chum in the Lower Yukon Area and 13,000 to 35,000 fall chum and coho salmon combined in the Upper Yukon Area). However, with the rebuilding effort underway with the Canadians for the Yukon River mainstem stock, and the continued slow recovery of the Toklat River stocks, it is likely that the commercial harvest will be to lower end of the guideline harvest range in 1993.

Coho Salmon

Coho salmon return primarily as 4-year-old fish. Comprehensive escapement information for coho salmon is lacking, but surveys in the Tanana River system indicated average escapements in 1989. The commercial coho salmon harvest is anticipated to range between 50,000 and 75,000, but will be dependent on the timing and frequency of fishing periods allowed for fall chum salmon.

TABLES AND FIGURES

Table 1. Guideline harvest ranges and mid-points for Alaskan and Canadian commercial harvests of Yukon River chinook, summer chum, and fall chum salmon.

Chinook Salmon

Alaskan Management District or Country	Guideline Harvest Range					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1 and 2	60,000	78.5	90,000	82.7	120,000	85.0
3	1,800	2.4	2,000	1.8	2,200	1.6
4	2,250	2.9	2,550	2.3	2,850	2.0
5A,B,C	2,400	3.1	2,600	2.4	2,800	2.0
5D	300	0.4	400	0.4	500	0.4
6	600	0.8	700	0.6	800	0.6
YT, Canada[a]	9,100	11.9	10,600	9.7	12,100	8.6
Total	76,450	100.0	108,850	100.0	141,250	100.0

Summer Chum Salmon

Alaskan Management District	Guideline Harvest Range					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1 and 2	251,000	62.8	503,000	62.9	755,000	62.9
3	6,000	1.5	12,500	1.6	19,000	1.6
4A[c]	113,000	28.3	225,500	28.2	338,000	28.2
4B,C	16,000	4.0	31,500	3.9	47,000	3.9
5	1,000	0.3	2,000	0.3	3000	0.3
6	13,000	3.3	25,500	3.2	38,000	3.2
Total	400,000	100.0	800,000	100.0	1,200,000	100.0

Fall Chum Salmon

Alaskan Management District or Country	Guideline Harvest Range					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1, 2, and 3	60,000	64.1	140,000	63.1	220,000	62.8
4B,C[c]	5,000	5.3	22,500	10.1	40,000	11.4
5A,B,C[c]	4,000	4.3	20,000	9.0	36000	10.3
5D[c]	1000	1.1	2,500	1.1	4000	1.1
6[c]	2,750	2.9	11,625	5.2	20,500	5.9
YT, Canada[a]	20,900	22.3	25,400	11.4	29,900	8.5
Total	93,650	100.0	222,025	100.0	350,400	100.0

[a] Includes only the mainstem Yukon River fisheries in Canada. Varies annually dependent on Indian Food fishery demand. Overall guideline harvest range for all Canadian fisheries are 16,800 to 19,800 for chinook salmon and 23,600 to 32,600 for fall chum salmon.

[b] Or the equivalent roe poundage of 61,000 to 183,000 pounds or some combination of fish and pounds of roe.

[c] Guideline harvest set in numbers of fall chum and coho salmon combined.

Table 2. Yukon River drainage subsistence salmon harvest, 1991. a

Village	Survey Date		Fishing Households b	Dogs	Chinook	Summer Chum	Fall Chum	Coho	Set Nets	Drift Nets	Fish Wheels
Sheldon Pt.	8/31		15	35	445	2,228	84	35	14	1	0
Alakanuk	8/29–30, 9/5		62	113	1,044	8,058	193	391	57	5	0
Emmonak	8/29, 9/3,5,6	c	47	60	1,311	8,401	2,027	801	43	4	0
Kotlik	9/4	d	50	141	3,125	9,105	1,631	581	45	5	0
Y–1 Subtotal			174	349	5,925	27,790	3,935	1,808	159	15	0
Mt. Village	9/7–8		53	89	1,171	4,743	1,473	868	10	43	0
Pitkas Pt.	9/9		11	89	852	1,452	610	347	2	9	0
St. Marys	9/9		49	109	1,838	7,832	1,592	1,270	2	47	0
Pilot Station	9/10	e	40	107	2,681	4,634	1,062	553	5	35	0
Marshall	9/10		36	149	1,277	2,042	891	259	13	23	0
Y–2 Subtotal			189	543	7,617	20,703	5,628	3,297	32	157	0
Russian Mission	9/11		22	55	1,349	837	425	396	7	15	0
Holy Cross	9/11		19	49	1,649	1,028	190	944	6	13	0
Y–3 Subtotal			41	104	2,998	1,865	615	1,340	13	28	0
Lower Yukon Total			404	996	16,540	50,358	10,178	6,445	204	200	0
Anvik	10/15–16		20	180	619	876	452	347	14	1	5
Shageluk	10/17	f	9	41	189	3,680	0	0	8	1	0
Grayling	10/16–17		27	200	874	8,094	3,616	1,363	23	0	4
Kaltag	10/8		28	170	1,866	2,287	2,834	1,260	5	13	8
Nulato	10/9		39	111	2,500	159	1,637	75	8	28	3
Koyukuk	10/10		17	56	885	2,328	2,781	307	11	5	1
Galena	10/3, 10/7–11		47	272	2,574	3,493	5,525	422	34	2	11
Ruby	10/10–11		20	143	971	1,352	2,858	410	13	1	6
Y–4 Subtotal		g	205	1,173	10,478	22,267	19,681	4,184	116	51	38
Tanana	11/4–5		34	550	2,483	2,779	40,868	4,448	17	1	16
Ramoart	10/30–31		11	106	988	20	5,801	58	7	0	4
Fairbanks NSB	permits	h	26	93	982	1,068	2,022	8	22	0	4
Stevens Village	10/30	i	9	65	2,035	1,385	2,481	0	7	0	2
Birch Creek	10/25		2	16	196	0	0	1	2	0	0
Beaver	10/29		10	50	713	2,355	7	0	9	0	1
Ft. Yukon	10/23–25		46	473	5,585	11,974	7,467	380	33	0	13
Circle	permits	j	15	113	1,720	51	6,340	5	12	0	3
Central	permits	k	2	20	151	0	73	0	2	0	0
Eagle	permits	l	27	130	1,193	807	7,985	0	24	0	3
Other	permits	m	4	28	202	19	100	12	3	0	1
Y–5 Subtotal			186	1,644	16,248	20,258	73,144	4,912	138	1	47
Main River Totals			795	3,813	43,266	92,883	103,003	15,541	458	252	85
Manley	permits	n	23	497	518	1,729	13,243	6,361	10	0	13
Minto	permits	o	13	272	134	748	5,276	528	11	0	2
Nenana	permits	p	35	583	1,654	1,499	17,932	10,171	14	0	21
Healy	permits	q	4	120	0	0	2,059	1,987	2	0	2
Fairbanks NSB	permits	r	108	407	378	1,096	1,671	2,501	81	0	27
Delta Junction	permits	s	15	16	0	0	46	3	13	0	2
Other	permits	t	11	87	3	10	242	12	9	0	2
Tanana R. Subtotal			209	1,982	2,687	5,082	40,469	21,561	140	0	69

–Continued–

Table 2. (page 2 of 2).

Village	Survey Date		Fishing Households b	Dogs	Chinook	Summer Chum	Fall Chum	Coho	Set Nets	Drift Nets	Fish Wheels
Huslia	10/1–2		16	255	198	7,857	411	150	16	0	0
Hughes	10/1		8	22	146	1,257	270	9	8	0	0
Allakaket	10/14		19	120	446	6,451	475	25	19	0	0
Alatna	10/14		7	17	5	962	38	83	7	0	0
Bettles	10/15		3	114	16	155	0	0	3	0	0
Koyukuk R. Subtotal			53	528	811	16,682	1,194	267	53	0	0
Venetie	10/21		7	195	9	3,393	758	12	6	0	1
Chalkyitsik	10/23		3	65	0	500	100	7	3	0	0
Subtotal Chandalar/Black Rivers			10	260	9	3,893	858	19	9	0	1
Subtotal Upper Yukon (Alaska)			663	5,587	30,233	68,182	135,346	30,943	458	52	155
Yukon River Drainage (Alaska) Total			1,067	8,583	48,773	118,540	145,524	37,388	660	252	155
Old Crow		u	–	–	163	0	1,576	0	–	–	–
Yukon River Mainstem Canada		u	–	–	9,238	0	2,438	0	–	–	–
Yukon Territory Totals		u	–	–	9,401	0	4,014	0	–	–	–
Grand Total Yukon River Drainage			1,067	8,583	58,174	118,540	149,538	37,388	660	252	155

a Data collected by Commercial Fisheries Division. Survey data is expanded for number of fishing households, number of dogs, and catch data. Permit data is unexpanded, the number of dogs is based on permits issued while the number of fishing households and their catch is based on returned permits. Gear data represents the principal gear types used by fishing households.

b Estimated number of households that fished in non–permit communities or number of permittees who reported fishing in permit required areas.

c Includes 661 chinook, 2,519 summer chum, 1,620 fall chum, and 761 coho salmon from ADF&G test fish catches.

d Includes 869 chinook, 3103 summer chum, 854 fall chum, and 334 coho salmon from ADF&G test fish catches.

e Includes 262 chinook, 984 summer chum, 505 fall chum, and 234 coho salmon from ADF&G test fish catches.

f Shageluk harvest data from households fishing mainstem Yukon River and Innoko River.

g Does not include summer chum salmon taken during commercial roe fishery used for subsistence.

h Data from Fairbanks North Star Borough fishermen who fished the Yukon River in a permit required area. Of the 37 permits issued, 35 returned their permits and 26 fished.

i Permit harvest information from Stevens Village residents was included in the survey data.

j Circle. Of the 22 permits issued, 21 returned their permits and 15 fished.

k Central. Of the 7 permits issued, 7 returned their permits and 2 fished.

l Eagle. Of the 35 permits issued, 35 returned their permits and 27 fished.

m Tok, Coldfoot, Koyukuk, Chicken, and Rampart residents who fished the Yukon River in a permit required area. 8 permits were issued, 7 returned their permits and 4 fished.

n Manley. Of the 30 permits issued, 27 returned their permits and 23 fished.

o Minto. Of the 34 permits issued, 28 returned their permits and 13 fished.

p Nenana. Of the 49 permits issued, 47 returned their permits and 35 fished. Includes 112 chinook, 98 summer chum, and 777 fall chum salmon from ADF&G test fishwheel.

q Healy. Of the 7 permits issued, 7 returned their permits and 4 fished.

r Data from Fairbanks North Star Borough fishermen who fished the Tanana River. 163 permits were issued, 155 returned their permits and 108 fished.

s Delta. Does not include a harvest of 741 post–spawned fall chum salmon. 15 permits were issued, 9 returned their permits, 7 fished.

t Residents of Tok, Dot Lake, Tanacross, and Valdez who fished the Tanana River. 13 permits were issued, 12 permits were returned, and 10 fished. Permit harvest information from 3 Tanana Village residents was included in the Tanana Village survey data.

u Indian Food Fish and Domestic catch data from Department of Fisheries & Oceans, Whitehorse, Yukon Territory.

Table 3. Subsistence salmon catches taken under authority of a permit, Yukon River Area, 1991.

Location	Subsistence Permits							
	Number Issued	Number Returned	Percent Returned	Number Not Fished a	Reported Harvest			
					Chinook	SChum	FChum	Coho
District 5								
Near Haul Road Bridge	52	46	88%	12	2,529	1,295	3,953	20
Circle/Eagle	70	69	99%	21	3,219	658	14,898	5
District 6 Tanana River								
Subdistrict 6–A	45	41	91%	10	420	1,716	17,472	8,486
Subdistrict 6–B	87	78	90%	27	1,796	2,373	21,629	11,971
Subdistrict 6–C b	149	142	95%	44	299	980	1,080	1,089
Upstream of Subdistrict 6–C	8	7	88%	1	0	0	288	14
Tanana River								
Whitefish	15	12	80%	2	0	0	0	1
Subsistence Use Total	426	395	93%	117	8,263	7,022	59,320	21,586
Delta River Carcasses	8	4	50%	1	0	0	741	0
Grand Total	434	399	92%	118	8,263	7,022	60,061	21,586

a The number of fishermen that did not fish based on returned permits.
b Includes 112 chinook, 98 summer chum, and 777 fall chum givin away from ADF&G Nenana test fish wheel project.

Table 4. Preliminary estimates of commercial salmon sales and estimated harvests in the Alaska portion of the Yukon River drainage, 1992. [a,b]

District Subdist.	No. of Fishermen [c]	Chinook			Summer Chum			Fall Chum			Coho		
		Numbers	Roe	Estimated	Numbers	Roe	Estimated	Numbers	Roe	Estimated	Numbers	Roe	Estimated
1	438	74,212 [d]	–	74,212 [d]	177,329	–	177,329	0	–	0	0	–	0
2	263	38,139 [e]	–	38,139 [e]	147,129	–	147,129	0	–	0	0	–	0
Subtotal	675	112,351	–	112,351	324,458	–	324,458	0	–	0	0	–	0
3	19	1,819	–	1,819	65	–	65	0	–	0	0	–	0
Total Lower Yukon	679	114,170	–	114,170	324,523	–	324,523	0	–	0	0	–	0
4–A	71	0	86	50	0	99,701	184,171 [f]	0	0	0	0	0	0
4–B,C	22	1,651	2,187	2,344	2,659	11,108	15,177	0	0	0	0	0	0
Subtotal District 4	90	1,651	2,273	2,394	2,659	110,809	199,348	0	0	0	0	0	0
5–A,B,C	25	3,395	7	3,398	102	295	430	0	0	0	0	0	0
5–D	3	457	0	457	0	0	0	0	0	0	0	0	0
Subtotal District 5	28	3,852	7	3,855	102	295	430	0	0	0	0	0	0
District 6	25	572	884	752	5,029	1,892	7,228	15,721	2,806	19,022	6,556	1,680	7,979
Total Upper Yukon	143	6,076	3,164	7,001	7,790	112,996	207,006	15,721	2,806	19,022	6,556	1,680	7,979
Total Yukon Area	822	120,245	3,164	121,171	332,313	112,996	531,529	15,721	2,806	19,022	6,556	1,680	7,979

[a] Commercial sales reported in numbers of fish sold in the round and pounds of unprocessed roe sold by fishermen. Unless otherwise noted, estimated harvest is the number of fish sold in the round plus the estimated number of females harvested to produce the roe sold.

[b] Does not include Department test fish sales.

[c] Number of unique permits fished by district, subdistrict, or area. Area totals may not add up due to transfers between districts or subdistricts.

[d] Includes unlawful purchases of 1,218 chinook and 31 summer chum salmon.

[e] Includes unlawful purchases of 207 chinook and 91 summer chum salmon.

[f] Estimated harvest of subdistrict 4–A summer chum salmon is the estimated number of males and females harvested to produce roe sold.

Table 5. Commercial chinook salmon sales and harvest by district, Yukon River drainage in Alaska, 1961–1992. a,b

	Lower Yukon Area				Upper Yukon Area										
					Dist 4			Dist 5			Dist 6			Subtotal	
							Estimated			Estimated			Estimated	Estimated	Alaska
Year	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe	Harvest c	Numbers	Roe	Harvest c	Numbers	Roe	Harvest c	Harvest	Total
1961	84,466	29,026	4,368	117,860	–	–	–	–	–	–	–	–	–	1,804	119,664
1962	67,099	22,224	4,687	94,010	–	–	–	–	–	–	–	–	–	724	94,734
1963	85,004	24,221	7,020	116,245	–	–	–	–	–	–	–	–	–	803	117,048
1964	67,555	20,246	4,705	92,506	–	–	–	–	–	–	–	–	–	1,081	93,587
1965	89,268	23,763	3,204	116,235	–	–	–	–	–	–	–	–	–	1,863	118,098
1966	70,788	16,927	3,612	91,327	–	–	–	–	–	–	–	–	–	1,988	93,315
1967	104,350	20,239	3,618	128,207	–	–	–	–	–	–	–	–	–	1,449	129,656
1968	79,466	21,392	4,543	105,400	–	–	–	–	–	–	–	–	–	1,126	106,526
1969	71,688	14,756	3,595	90,039	–	–	–	–	–	–	–	–	–	988	91,027
1970	56,648	17,141	3,705	77,494	–	–	–	–	–	–	–	–	–	1,651	79,145
1971	86,042	19,226	3,490	108,758	–	–	–	–	–	–	–	–	–	1,749	110,507
1972	70,052	17,855	3,841	91,748	–	–	–	–	–	–	–	–	–	1,092	92,840
1973	56,981	13,859	3,204	74,044	–	–	–	–	–	–	–	–	–	1,309	75,353
1974	71,840	17,948	3,480	93,268	685	–	685	2,663	–	2,663	1,473	–	1,473	4,821	98,089
1975	44,585	11,315	4,177	60,077	389	–	389	2,872	–	2,872	500	–	500	3,761	63,838
1976	62,410	16,556	4,148	83,114	409	–	409	3,151	–	3,151	1,102	–	1,102	4,662	87,776
1977	69,915	16,722	3,965	90,602	985	–	985	4,162	–	4,162	1,008	–	1,008	6,155	96,757
1978	59,006	32,924	2,916	94,846	608	–	608	3,079	–	3,079	635	–	635	4,322	99,168
1979	75,007	41,498	5,018	121,523	1,989	–	1,989	3,389	–	3,389	772	–	772	6,150	127,673
1980	90,382	50,004	5,240	145,626	1,521	–	1,521	4,891	–	4,891	1,947	–	1,947	8,359	153,985
1981	99,506	45,781	4,023	149,310	1,347	–	1,347	6,374	–	6,374	987	–	987	8,708	158,018
1982	74,450	39,132	2,609	116,191	1,087	–	1,087	6,395	–	6,395	981	–	981	7,453	123,644
1983	95,457	43,229	4,106	142,792	601	–	601	3,606	–	3,606	911	–	911	5,118	147,910
1984	74,671	36,697	3,039	114,407	961	–	961	3,669	–	3,669	867	–	867	5,497	119,904
1985	90,011	48,365	2,508	140,964	664	–	664	3,418	–	3,418	1,142	–	1,142	5,224	146,188
1986	53,035	41,849	901	95,785	502	–	502	2,733	–	2,733	950	–	950	4,185	99,970
1987	76,643	47,458	2,039	126,140	1,524	–	1,524	3,758 d	–	3,758	3,338 e	–	3,338	8,620	134,760
1988	57,109	35,188	1,787	94,084	3,169	–	3,169	3,436	–	3,436	762	–	762	7,357	101,421
1989	59,153	33,225	1,845	94,023	2,790	–	2,790	3,286	–	3,286	1,741	–	1,741	7,817	101,840
1990	51,181	33,213	2,341	86,715	3,538	8	3,538	3,353	47	3,365	1,757	1,678	2,156	9,059	95,774
1991	56,332 f	39,260 f	2,344	97,936	2,446	2,222	3,502	3,810	62	3,928	686	1,545	1,072	8,480	106,416
1992	74,212 g	38,139 g	1,819	114,170	1,651	2,273	2,394	3,852	7	3,865	572	884	752	7,001	121,171
5 Yr Avg 1982–86	77,525	41,854	2,649	122,028	763	–	763	3,762	–	3,762	970	–	970	5,495	127,523
5 Yr Avg 1987–91	60,080	37,669	2,027	99,776	2,691	–	2,919	3,529	–	3,534	1,657	–	1,614	8,267	108,042

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe.
b Includes department test fish sales in the Lower Yukon Area prior to 1991.
c The estimated harvest is the number of fish sold in the round plus the estimated number of females to produce the roe sold.
d Includes illegal sales of 663 chinook salmon.
e Includes illegal sales of 2,136 chinook salmon.
f Includes unlawful purchases of 2,711 chinook salmon in District 1 and 284 chinook salmon in District 2.
g Includes unlawful purchases of 1,218 chinook salmon in District 1 and 207 chinook salmon in District 2.

Table 8. Commercial summer chum salmon sales and harvest by district, Yukon River drainage in Alaska, 1967–1992. a

Year	Lower Yukon Area b				Upper Yukon Area										
					District 4			District 5			District 6				
	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe	Estimated Harvest c	Numbers	Roe	Estimated Harvest d	Numbers	Roe	Estimated Harvest d	Subtotal Estimated Harvest	Alaska Total Harvest
1967	9,453	1,425	57	10,935	–	–	–	–	–	–	–	–	–	0	10,935
1968	12,995	1,407	68	14,470	–	–	–	–	–	–	–	–	–	0	14,470
1969	56,886	5,080	0	61,966	–	–	–	–	–	–	–	–	–	0	61,966
1970	117,357	19,649	0	137,006	–	–	–	–	–	–	–	–	–	0	137,006
1971	93,928	6,112	50	100,090	–	–	–	–	–	–	–	–	–	0	100,090
1972	114,234	20,907	527	135,668	–	–	–	–	–	–	–	–	–	0	135,668
1973	221,644	63,402	463	285,509	–	–	–	–	–	–	–	–	–	0	285,509
1974	466,004	74,152	1,721	541,877	27,866	–	27,866	6,831	–	6,831	13,318	–	13,318	48,015	589,892
1975	418,323	99,139	0	517,462	165,054	–	165,054	12,997	–	12,997	14,782	–	14,782	192,833	710,295
1976	273,204	99,190	9,802	382,196	211,307	–	211,307	774	–	774	6,617	–	6,617	218,698	600,894
1977	250,652	105,679	3,412	359,743	169,541	–	169,541	1,274	–	1,274	4,317	–	4,317	175,132	534,875
1978	393,785	227,548	27,003	648,336	364,184	16,920	381,104	4,092	605	5,497	34,814	8,236	43,050	429,651	1,077,987
1979	368,934	172,838	40,015	582,787	169,430	35,317	204,747	8,608	1,009	9,617	18,491	3,891	22,382	236,746	819,533
1980	391,252	308,704	44,782	744,738	147,560	135,824	283,384	456	0	456	35,855	3,282	39,137	322,977	1,067,715
1981	507,158	351,878	54,471	913,507	59,718	187,032	330,445	1,236	49	1,285	32,477	1,987	34,464	366,194	1,279,701
1982	249,516	182,344	4,086	435,946	3,647	151,281	257,719	213	21	234	21,597	1,517	23,114	281,067	717,013
1983	451,164	248,092	14,600	713,856	6,672	148,125	255,388	42	1,856	1,898	24,309	18	24,327	281,613	995,469
1984	292,676	236,931	1,087	530,694	1,009	166,842	278,070	645	47	692	56,249	335	56,584	335,346	866,040
1985	247,486	188,099	1,792	437,377	12,007	247,085	427,483	700	0	700	66,913	1,540	68,453	496,636	934,013
1986	381,127	288,427	442	669,996	300	269,545	465,535	690	0	690	50,483	2,146	52,629	518,854	1,188,850
1987	222,898	174,876	3,501	401,275	29,991	121,474	209,800	362	44	406	10,610	450	11,060	221,266	622,541
1988	648,198	425,172	13,965	1,087,335	24,051	254,526	490,074	722	363	1,085	40,129	1,646	41,775	532,934	1,620,269
1989	547,631	343,962	7,578	899,171	18,554	283,305	510,244	154	373	527	42,115	4,871	46,986	557,757	1,456,928
1990	148,911	132,507	643	282,061	12,364	105,723	218,029	11	594	671	11,082 g	3,059	14,788	233,488	515,549
1991	140,470 e	175,149	8,912	324,531	6,381	137,232	306,550	4	28	35	18,197	4,716	23,893	330,478	655,009
1992	177,329 f	147,129 f	65	324,523	2,659	110,809	205,034	102	295	430	5,029	1,892	7,228	212,692	537,215
5 Yr Avg 1982–86	324,394	228,779	4,401	557,574	4,727	196,576	336,839	458	385	843	43,910	1,111	45,021	382,703	940,277
5 Yr Avg 1987–91	341,622	250,333	6,920	598,875	18,268	180,452	346,939	251	280	545	24,427	2,948	27,700	375,185	974,059

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe (may include small amounts of chinook salmon roe).
b Includes department test fish sales in the Lower Yukon Area prior to 1991.
c Estimated harvest is the estimated number of males and females harvested to produce the roe sold. It is assumed that summer chum salmon sold in the round were primarily male salmon that are estimated in roe expansion.
d Estimated harvest is the number of fish sold in the round plus the estimated number of females to produce roe sold.
e Includes unlawful purchases of 1,023 summer chum salmon in District 1.
f Includes unlawful purchases of 31 chum salmon in District 1 and 91 chum salmon in District 2.
g Includes 1,278 female summer chum salmon sold with roe extracted and sold separately. The estimated harvest of females to produce roe sold is decreased by a similar amount.

Table 7. Commercial fall chum salmon sales by district, Yukon River drainage in Alaska, 1961–1992. a

Year	Lower Yukon Area b				Upper Yukon Area											Alaska Total Harvest
					District 4			District 5			District 6			Subtotal		
	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe c	Estimated Harvest d	Numbers	Roe c	Estimated Harvest d	Numbers	Roe c	Estimated Harvest d	Roe c	Estimated Harvest d	
1961	42,461	–	–	42,461	–	–	–	–	–	–	–	–	–	0	0	42,461
1962	53,116	–	–	53,116	–	–	–	–	–	–	–	–	–	0	0	53,116
1963	–	–	–	0	–	–	–	–	–	–	–	–	–	0	0	0
1964	8,347	–	–	8,347	–	–	–	–	–	–	–	–	–	0	0	8,347
1965	22,936	–	–	22,936	–	–	–	–	–	–	–	–	–	0	381	23,317
1966	69,836	–	1,209	71,045	–	–	–	–	–	–	–	–	–	0	0	71,045
1967	36,451	–	1,823	38,274	–	–	–	–	–	–	–	–	–	0	0	38,274
1968	49,857	–	3,068	52,925	–	–	–	–	–	–	–	–	–	0	0	52,925
1969	126,866	–	1,722	130,588	–	–	–	–	–	–	–	–	–	0	722	131,310
1970	200,306	4,658	3,285	208,449	–	–	–	–	–	–	–	–	–	0	1,146	209,595
1971	188,533	–	–	188,533	–	–	–	–	–	–	–	–	–	0	1,061	189,594
1972	136,711	12,898	1,313	150,922	–	–	–	–	–	–	–	–	–	0	1,254	152,176
1973	173,783	45,304	–	219,087	–	–	–	–	–	–	–	–	–	0	13,003	232,090
1974	176,036	53,540	552	230,128	9,213	–	9,213	23,551	–	23,551	26,884	–	26,884	0	59,648	289,776
1975	158,183	51,666	5,590	215,439	13,666	–	13,666	27,212	–	27,212	18,692	–	18,692	0	59,570	275,009
1976	105,851	21,212	4,250	131,313	1,742	–	1,742	5,387	–	5,387	17,948	–	17,948	0	25,077	156,390
1977	131,758	51,994	15,851	199,603	13,980	–	13,980	25,730	–	25,730	18,673	–	18,673	0	58,383	257,986
1978	127,947	51,646	11,527	191,120	10,988	1,721	12,709	21,016	5,220	26,236	13,259	3,687	16,946	10,628	55,891	247,011
1979	109,406	94,042	25,955	229,403	48,899	3,199	52,098	47,459	8,097	55,556	34,185	7,170	41,355	18,466	149,009	378,412
1980	106,829	83,881	13,519	204,229	27,978	4,347	32,325	41,771	605	42,376	19,452	68	19,520	5,020	94,221	298,450
1981	167,834	154,683	19,043	341,760	12,082	1,311	13,393	86,620	6,955	93,575	25,909	3,019	29,008	11,285	135,976	477,736
1982	97,484	96,581	5,815	199,880	3,894	167	4,061	13,593	42	13,635	6,820	596	7,416	805	25,112	224,992
1983	124,371	85,645	10,018	220,034	4,482	1,963	6,445	43,993	0	43,993	34,009	3,101	37,190	5,064	87,628	307,662
1984	78,751	70,803	6,429	155,983	7,625	2,215	9,840	24,060	57	24,117	20,564	56	20,620	2,328	54,577	210,560
1985	129,948	40,490	5,164	175,602	24,452	2,525	26,977	25,338	0	25,338	42,352	0	42,352	2,525	94,667	270,269
1986	59,352	51,307	2,793	113,452	2,045	0	2,045	22,053	395	22,448	1,892	182	2,074	577	26,567	140,019
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	45,629	31,861	2,090	79,480	15,082	1,421	17,083	16,989	0	16,989	21,844	1,806	23,650	3,227	57,722	137,202
1989	77,876	97,906	15,332	191,114	11,776	3,407	15,183	18,215	3,999	22,204	49,090	7,353	56,443	14,749	93,830	284,944
1990	27,337	37,173	3,715	68,225	4,999	2,351	8,166	7,778	1,058	8,976	44,066 e	7,535	50,974	10,944	68,116	136,341
1991	59,724	102,628	9,213	171,565	3,737	1,616	6,091	27,355	3,625	32,114	28,195	14,154	44,448	19,395	82,653	254,218
1992	0	0	0	0	0	0	0	0	0	0	15,721	2,806	19,022	2,806	19,022	19,022
5 Yr Ave 1982–86	97,981	68,985	6,044	172,890	8,500	1,374	9,874	25,807	99	25,906	21,143	767	21,930	2,260	57,710	230,700
5 Yr Ave 1987–91	42,093	53,914	6,070	102,077	7,233	1,759	9,305	14,067	1,734	16,057	28,639	6,170	35,103	9,663	60,464	162,541

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe.
b Includes department test fish sales in the Lower Yukon Area prior to 1991.
c May include small amounts of coho salmon roe.
d Estimated harvest is the number of fish sold in the round plus the estimated number of females to produce roe sold.
e Includes 884 female fall chum salmon sold with roe extracted and sold separately.

Table 8. Commercial coho salmon sales and harvest by district, Yukon River drainage in Alaska, 1961–1992. a

	Lower Yukon Area b				Upper Yukon Area						
							Dist. 6				
Year	Dist. 1	Dist. 2	Dist. 3	Subtotal	Dist. 4	Dist. 5	Number	Roe	Estimated Harvest c	Subtotal	Total Harvest
1961	2,855	–	–	2,855	–	–	–	–	–	0	2,855
1962	22,928	–	–	22,928	–	–	–	–	–	0	22,928
1963	5,572	–	–	5,572	–	–	–	–	–	0	5,572
1964	2,446	–	–	2,446	–	–	–	–	–	0	2,446
1965	350	–	–	350	–	–	–	–	–	0	350
1966	19,254	–	–	19,254	–	–	–	–	–	0	19,254
1967	9,925	0	1,122	11,047	–	–	–	–	–	0	11,047
1968	13,153	0	150	13,303	–	–	–	–	–	0	13,303
1969	13,989	0	1,009	14,998	–	–	–	–	–	95	15,093
1970	12,632	0	0	12,632	–	–	–	–	–	556	13,188
1971	12,165	0	0	12,165	–	–	–	–	–	38	12,203
1972	21,705	506	0	22,211	–	–	–	–	–	22	22,233
1973	34,860	1,781	0	36,641	–	–	–	–	–	0	36,641
1974	13,713	176	0	13,889	0	1,409	1,479	–	1,479	2,888	16,777
1975	2,288	200	0	2,488	0	5	53	–	53	58	2,546
1976	4,064	17	0	4,081	0	0	1,103	–	1,103	1,103	5,184
1977	31,720	5,319	538	37,577	0	2	1,284	–	1,284	1,286	38,863
1978	16,460	5,835	758	23,053	32	1	3,066	–	3,066	3,099	26,152
1979	11,369	2,850	0	14,219	155	0	2,791	–	2,791	2,946	17,165
1980	4,829	2,660	0	7,489	30	0	1,226	–	1,226	1,256	8,745
1981	13,129	7,848	419	21,396	0	0	2,284	–	2,284	2,284	23,680
1982	15,115	14,179	87	29,381	15	0	7,780	–	7,780	7,795	37,176
1983	4,595	2,557	0	7,152	0	0	6,168	–	6,168	6,168	13,320
1984	29,472	43,064	621	73,157	1,095	0	7,688	–	7,688	8,783	81,940
1985	27,676	17,125	171	44,972	938	0	11,762	–	11,762	12,700	57,672
1986	24,824	21,197	793	46,814	0	0	441	–	441	441	47,255
1987	0	0	0	0	0	0	0	–	0	0	0
1988	38,435	34,776	1,418	72,630	2	8	13,972	–	13,972	13,982	86,612
1989	24,672	38,522	3,988	67,182	3	84	16,084	–	16,084	16,171	83,353
1990	13,354	16,435	918	30,707	0	0	11,987 d	4,042	14,804	11,987	42,694
1991	54,095	40,898	1,905	96,898	14	0	6,268	4,299	9,774	6,282	103,180
1992	0	0	0	0	0	0	6,556	1,680	7,979	7,979	7,979
5 Yr Ave 1982–86	20,336	19,624	334	40,295	410	0	6,768	–	6,768	7,177	47,473
5 Yr Ave 1987–91	25,711	26,128	1,648	53,483	4	18	9,682	–	10,927	9,684	63,168

a Sales reported in numbers of fish sold in the round and pounds of roe. Coho salmon roe sales not separated from fall chum salmon until 1990.

b Includes department test fish sales prior to 1991.

c Estimated harvest is the number of fish sold in the round plus the estimated number of females to produce the roe sold.

d Includes 438 female coho salmon sold with roe extracted and sold separately.

Table 9. Canadian catch of Yukon River chinook salmon, 1961–1992.[a]

Year	Mainstem Yukon River Harvest						Porcupine River Indian Food Fish	Total Utilization
	Commercial	Domestic	Indian Food Fish	Sport[b]	Combined Non-Commercial	Total		
1961	3,446		9,300		9,300	12,746	500	13,246
1962	4,037		9,300		9,300	13,337	600	13,937
1963	2,283		7,750		7,750	10,033	44	10,077
1964	3,208		4,124		4,124	7,332	76	7,408
1965	2,265		3,021		3,021	5,286	94	5,380
1966	1,942		2,445		2,445	4,387	65	4,452
1967	2,187		2,920		2,920	5,107	43	5,150
1968	2,212		2,800		2,800	5,012	30	5,042
1969	1,640		957		957	2,597	27	2,624
1970	2,611		2,044		2,044	4,655	8	4,663
1971	3,178		3,260		3,260	6,438	9	6,447
1972	1,769		3,960		3,960	5,729	–	5,729
1973	2,199		2,319		2,319	4,518	4	4,522
1974	1,808	406	3,342		3,748	5,556	75	5,631
1975	3,000	400	2,500		2,900	5,900	100	6,000
1976	3,500	500	1,000		1,500	5,000	25	5,025
1977	4,720	531	2,247		2,778	7,498	29	7,527
1978	2,975	421	2,485		2,906	5,881	–	5,881
1979	6,175	1,200	3,000		4,200	10,375	–	10,375
1980	9,500	3,500	7,546	300	11,346	20,846	2,000	22,846
1981	8,593	237	8,879	300	9,416	18,009	100	18,109
1982	8,640	435	7,433	300	8,168	16,808	400	17,208
1983	13,027	400	5,025	300	5,725	18,752	200	18,952
1984	9,885	260	5,850	300	6,410	16,295	500	16,795
1985	12,573	478	5,800	300	6,578	19,151	150	19,301
1986	10,797	342	8,625	300	9,267	20,064	300	20,364
1987	10,864	330	6,069	300	6,699	17,563	51	17,614
1988	13,217	282	7,178	650	8,110	21,327	100	21,427
1989	9,789	400	6,930	300	7,630	17,419	525	17,944
1990	11,324	247	7,101	300	7,648	18,972	258	19,230
1991	10,906	227	9,011	300	9,538	20,444	163	20,607
1992[c]	10,806	[d]	[d]	[d]		10,806	[d]	10,806
Average								
1961–91	3,488	899	4,057	300	4,428	7,916	182	8,099
1982–86	10,984	383	6,547	300	7,230	18,214	310	18,524
1987–91	11,220	297	7,258	370	7,925	19,145	219	19,364

[a] Catch in number of fish.
[b] Sport fish harvest unknown prior to 1980.
[c] Preliminary.
[d] Data are unavailable at this time.

Table 10. Canadian catch of Yukon River fall chum salmon, 1961–1992.[a]

Year	Mainstem Yukon River Harvest					Porcupine River Indian Food Fish	Total Utilization
	Commercial	Domestic	Indian Food Fish	Combined Non–Commercial	Total		
1961	3,276		3,800	0	7,076	2,000	9,076
1962	936		6,500	0	7,436	2,000	9,436
1963	2,196		5,500	0	7,696	20,000	27,696
1964	1,929		4,200	0	6,129	6,058	12,187
1965	2,071		2,183	0	4,254	7,535	11,789
1966	3,157		1,430	0	4,587	8,605	13,192
1967	3,343		1,850	0	5,193	11,768	16,961
1968	453		1,180	0	1,633	10,000	11,633
1969	2,279		2,120	0	4,399	3,377	7,776
1970	2,479		612	0	3,091	620	3,711
1971	1,761		150	0	1,911	15,000	16,911
1972	2,532		0	0	2,532	5,000	7,532
1973	2,806		1,129	0	3,935	6,200	10,135
1974	2,544	466	1,636	466	4,646	7,000	11,646
1975	2,500	4,600	2,500	4,600	9,600	11,000	20,600
1976	1,000	1,000	100	1,000	2,100	3,100	5,200
1977	3,990	1,499	1,430	1,499	6,919	5,560	12,479
1978	3,356	728	482	728	4,566	5,000	9,566
1979	9,084	2,000	11,000	2,000	22,084	–	22,084
1980	9,000	4,000	3,218	7,218	16,218	6,000	22,218
1981	15,260	1,611	2,410	4,021	19,281	3,000	22,281
1982	11,312	683	3,096	3,779	15,091	1,000	16,091
1983	25,990	300	1,200	1,500	27,490	2,000	29,490
1984	22,932	535	1,800	2,335	25,267	4,000	29,267
1985	35,746	279	1,740	2,019	37,765	3,500	41,265
1986	11,464	222	2,150	2,372	13,836	657	14,493
1987	40,591	132	3,622	3,754	44,345	135	44,480
1988	30,263	349	1,882	2,231	32,494	1,071	33,565
1989	17,549	100	2,462	2,562	20,111	2,909	23,020
1990	27,537	0	3,675	3,675	31,212	2,410	33,622
1991	31,404	0	2,438	2,438	33,842	1,576	35,418
1992[b]	18,599	[c]	2,614	[c]	21,213	[c]	21,213
Average							
1961–81	3,617	1,988	2,544	1,025	6,918	8,611	13,529
1982–86	21,489	404	1,997	2,401	23,890	2,231	26,121
1987–91	29,469	116	2,816	2,932	32,401	1,620	34,021

[a] Catch in number of fish.
[b] Preliminary.
[c] Data are unavailable at this time.

Table 11. Sonar estimates of salmon passage on the mainstem Yukon River at Pilot Station, 1986–1992.

Year	Dates of Operation	Chinook	Summer Chum	Fall Chum	Coho	Pink
1986 [a,b]	6/09–9/12	169,068	1,932,868	583,439	210,066	1,082,000
1987 [b]	6/09–9/06	116,126	826,384	596,410	227,982	13,000
1988 [b]	6/02–9/14	120,652	1,772,839	424,356	263,053	612,000
1989 [b]	6/04–9/11	91,548	1,603,647	605,843	169,358	3,000
1990 [c]	6/05–9/04	156,028	931,498	249,577 [d]	77,316 [d]	206,000
1991 [c]	6/05–9/01	75,681	1,232,874	240,740	59,822	N/A
1992 [e]	–	–	–	–	–	–

[a] Passage estimates for all species in 1986 were expanded based on river bank profile and water depth. This expansion was not necessary for subsequent years.
[b] Passage estimates for all species in 1986 through 1989 include only fish passage within the insonified zone.
[c] Passage estimates for fall chum and coho salmon in 1990 and 1991 include an estimate of passage beyond the insonified zone. Passage estimates for other species in 1990 and 1991 include only fish passage within the isonified zone.
[d] Does not include salmon which passed beyond the sonar range.
[e] Sonar did not operate in 1992.

Table 12. Subsistence and personal use salmon catch in the Yukon River drainage in Alaska, 1961–1992. [a,b]

Year	Chinook	Summer Chum	Fall Chum [c]	Coho [c]	Total
1961	21,488	305,317	101,772	9,192	437,769
1962	11,110	261,856	87,285	9,480	369,731
1963	24,862	297,094	99,031	27,699	448,686
1964	16,231	361,080	120,360	12,187	509,858
1965	16,608	336,848	112,283	11,789	477,528
1966	11,572	154,508	51,503	13,192	230,775
1967	16,448	206,233	68,744	17,164	308,589
1968	12,106	133,880	44,627	11,613	202,226
1969	14,000	156,191	52,063	7,776	230,030
1970	13,874	166,504	55,501	3,966	239,845
1971	25,684	171,487	57,162	16,912	271,245
1972	20,258	108,006	36,002	7,532	171,798
1973	24,317	161,012	53,670	10,236	249,235
1974	19,964	227,811	93,776	11,646	353,197
1975	13,045	211,888	86,591	20,708	332,232
1976	17,806	186,872	72,327	5,241	282,246
1977	17,581	159,502	82,771	16,333	276,187
1978	30,297	188,303	84,239	7,787	310,626
1979	31,005	191,287	214,881	9,794	446,967
1980	42,724	167,705	167,637	20,158	398,224
1981	29,690	117,629	177,240	21,228	345,787
1982	28,158	117,413	132,092	35,894	313,557
1983	49,478	149,180	187,864	23,895	410,417
1984	42,428	166,630	172,495	49,020	430,573
1985	39,771	157,744	203,947	32,264	433,726
1986	45,238	182,337	163,466	34,468	425,509
1987	53,124	174,940	361,663 [d]	84,894 [d]	674,621
1988	46,590	202,914	156,476	69,138	475,118
1989	51,280	168,849	209,297	41,510	470,936
1990	52,099	118,509	177,658	47,816	396,082
1991	45,621	169,370	138,411	37,388	390,790
1992 [e]					
5 Yr. Ave 1982–1986	41,015	154,661	171,973	35,108	402,756
5 Yr. Ave 1987–1991	49,743	166,916	208,701	56,149	481,509

[a] Includes personal use catches beginning in 1987 and ending in June 1990. Does not include usage of salmon from commercial related harvest to produce roe sales.

[b] Catches estimated for 1961–1976. Catches of salmon other than chinook salmon were not differentiated by species until 1977.

[c] Minimum estimates for 1961–1978 because surveys were typically conducted before the end of the season.

[d] Includes illegal sales involving an additional estimated 115,829 fall chum and 36,291 coho salmon in Districts 5 and 6.

[e] Subsistence catch information in preparation.

Table 13. Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961–1992.[a]

Year	Tincup Creek	Tatchun River[b]	Little Salmon River	Big Salmon River[c]	Nisutlin River[d]	Wolf River[f]	Whitehorse Fishway[g]	Canada Mainstem Tagging Estimate[h]
1961	–	–	–	–	–	–	1,068	–
1962	–	–	–	–	–	–	1,500	–
1963	–	–	–	–	–	–	483	–
1964	–	–	–	–	–	–	595	–
1965	–	–	–	–	–	–	903	–
1966	–	7[i]	–	–	–	–	563	–
1967	–	–	–	–	–	–	533	–
1968	–	–	173[i]	857[i]	407[i]	–	414	–
1969	–	–	120	286	105	–	334	–
1970	–	100	–	670	615	71[i]	625	–
1971	–	130	275	275	650	750	856	–
1972	–	80	126	415	237	13	391	–
1973	100	99	27[i]	75[i]	36[i]	–	224	–
1974	–	192	–	70[i]	48[i]	–	273	–
1975	–	175	–	153[i]	249	40[i]	313	–
1976	–	52	–	86[i]	102	–	121	–
1977	–	150	408	316[i]	77	–	277	–
1978	–	200	330	524	375	–	725	–
1979	–	150	489[i]	632	713	183[i]	1,184	–
1980	–	222	286[i]	1,436	975	377	1,383	–
1981	–	133	670	2,411	1,626	395	1,555	–
1982	–	73	403	758	578	104	473	19,790
1983	100	264	101[i]	540	701	95	905	28,989
1984	150	153	434	1,044	832	124	1,042	27,616[k]
1985	210	190	255	801	409	110	508	10,730
1986	228	155	54[i]	745	459[i]	109	557	16,415
1987	100	159	468	891	183	35	327	13,260
1988	204	152	368	765	267	66	405	23,118
1989	88	100	862	1,662	695	146	549	25,201
1990	83	643	665	1,806	652	188	1,407	37,699
1991	–	–	326	1,040	–	201[m]	1,266	20,743
1992[n]	73	106	494	617	241	110[m]	758	24,000
E.O.[p]								33,000–43,000[p]

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Survey rating is fair to good, unless otherwise noted. Latest table revision: November 18, 1992.

[b] All foot surveys except 1978 (boat survey) and 1986 (aerial survey).

[c] For 1968, 1970, and 1971 counts are from mainstem Big Salmon River. For all other years counts are from the mainstem Big Salmon River between Big Salmon Lake and the vicinity of South Creek.

[d] One Hundred Mile Creek to Sidney Creek.

[f] Wolf Lake to Red River.

[g] Includes 50, 90, 292, 506, 243 fin–clipped hatchery–origin salmon in 1988, 1989, 1990, 1991, and 1992 respectively.

[h] Estimated total spawning escapement excluding Porcupine River (estimated border escapement minus the Canadian catch).

[i] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

[k] Estimate derived by dividing the annual 5–area (Whitehorse Fishway, Big Salmon, Nisutlin, Wolf, Tatchun) count by the average proportion of the annual 5–area index count to the estimated spawning escapements from the DFO tagging study for years 1982, 1983, and 1985–1989.

[m] Counts are for Wolf Lake to Fish Lake outlet.

[n] Preliminary

[p] Interim escapement objective. Stabilization escapement objective for years 1990 – 1995 is 18,000 salmon.

Table 14. Chinook salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1961–1992.[a]

Year	Andreafsky River		Anvik River[c]		Nulato River			Chena River			Salcha River		
	East Fork	West Fork	River	Index Area	North Fork[c]	South Fork	Gisasa River	Population Estimate	River	Index Area[d]	Population Estimate	River	Index Area[e]
1961	1,003	–	1,226	–	376[f]	167	266[f]	–	–	–	–	2,878	–
1962	675[f]	762[f]	–	–	–	–	–	–	61[f,g]	–	–	937	–
1963	–	–	–	–	–	–	–	–	137[f]	–	–	–	–
1964	887	705	–	–	–	–	–	–	–	–	–	450	–
1965	–	344[f]	850[f]	–	–	–	–	–	–	–	–	408	–
1966	361	303	838	–	–	–	–	–	–	–	–	800	–
1967	–	276[f]	336[f]	–	–	–	–	–	–	–	–	–	–
1968	380	383	310[f]	–	–	–	–	–	–	–	–	739	–
1969	274[f]	231[f]	296[f]	–	–	–	–	–	–	–	–	461[f]	–
1970	665	574[f]	388	–	–	–	–	–	8[f]	–	–	1,882	–
1971	1,904	1,682	–	–	–	–	–	–	193[f,g]	–	–	158[f]	–
1972	798	582[f]	1,198	–	–	–	–	–	138[f,g]	–	–	1,193	1,034
1973	825	788	813	–	–	–	–	–	21[f]	–	–	391	352[h]
1974	–	285	471[f]	–	55[f]	23[f]	181	–	1,016[f,i]	959[i]	–	1,857	1,620
1975	993	301	730	–	123	81	385	–	316[i]	262[i]	–	1,055	950[h]
1976	818	643	1,053	–	471	177	332	–	531	496	–	1,841	1,473
1977	2,008	1,499	1,371	–	286	201	255	–	563	–	–	1,202	1,052
1978	2,487	1,062	1,324	–	498	422	45[f]	–	1,726	–	–	3,499	3,258
1979	1,180	1,134	1,484	–	1,093	414	484	–	1,159[f]	–	–	4,789	4,310[h]
1980	958[f]	1,500	1,330	1,192	954[f]	369[f]	951	–	2,541	–	–	6,757	8,126
1981	2,148[f]	231[f]	807[f]	577[f]	–	791	–	–	600[f]	–	–	1,237	1,121
1982	1,274	851	–	–	–	–	421	–	2,073	–	–	2,534	2,346
1983	–	–	653[f]	378[f]	528	480	572	–	2,553	2,336	–	1,961	1,803
1984	1,573[f]	1,993	641[f]	574[f]	–	–	–	–	501	494	–	1,031	906
1985	1,817	2,248	1,051	720	1,600	1,180	735	–	2,553	2,262	–	2,035	1,860
1986	1,954	3,158	1,118	918	1,452	1,522	1,348	9,065	2,031	1,935	–	3,388	3,031[h]
1987	1,608	3,281	1,174	879	1,145	493	731	6,404	1,312	1,209	4,771	1,898	1,871
1988	1,020	1,448	1,805	1,449	1,061	714	797	3,346	1,966	1,760	4,562	2,781	2,553
1989	1,399	1,089	442[f]	212[f]	–	–	–	2,666	1,280	1,185	3,294	2,333	2,136
1990	2,503	1,545	2,347	1,595	568[f]	430[f,j]	864[f]	5,603	1,436	1,402	10,728	3,744	3,429
1991	1,938	2,544	875[f]	625[f]	767	1,253	1,690	3,025	1,277[f]	1,277[f]	5,608	2,212[f]	1,925[f]
1992[k]	1,030[f]	2,002[f]	1,536	931	348	231	910	5,230	825[f]	799[f]	8,410	1,484[f]	1,438[f]
E.O.[m]	>1500	>1400	>1,300[n]	>500[n]	>800	>500	>600	–	–	>1,700	–	–	>2,500

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Survey rating is fair to good, unless otherwise noted. Latest table revision: November 18, 1992.

[b] From 1961–1970, river count data are from aerial surveys of various segments of the mainstem Anvik River. From 1972–1979, counting tower operated; mainstem aerial survey counts below the tower were added to tower counts. From 1980–present, aerial survey counts for the river are or available minimal estimates for the entire Anvik River drainage. Index area counts are from the mainstem Anvik River between the Yellow River and McDonald Creek.

[c] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted.

[d] Chena River index area for assessing the escapement objective is from Moose Creek Dam to Middle Fork River.

[e] Salcha River index area for assessing the escapement objective is from the TAPS crossing to Caribou Creek.

[f] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

[g] Boat survey.

[h] Data unavailable for index area. Calculated from historic (1972–91) average ratio of index area counts to total river counts (0.90:1.0).

[i] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.

[k] Preliminary

[m] Interim escapement objectives. Established March, 1992.

[n] Interim escapement objective for the entire Anvik River drainage is 1,300 salmon. Interim escapement objective for mainstem Anvik River between the Yellow River and McDonald Creek is 500 salmon.

Table 15. Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973–1992.[a]

Year	Andreafsky River			Anvik River		Nulato River					
	East Fork								Hogatza River		
	Aerial	Sonar or Tower	West Fork	Tower & Aerial[b]	Sonar	South Fork	North Fork[c]	Gisasa River	(Clear and Caribou Crs)	Chena River	Salcha River
1973	10,149 [d]	–	51,835	86,665 [d]	–	–	–	–	–	79 [d]	–
1974	3,215 [d]	–	33,578	201,277	–	29,016	29,334	22,022	–	4,349	3,510
1975	223,485	–	235,954	845,485	–	61,215	87,280	56,904	22,355	1,670	7,573
1976	105,347	–	118,420	406,166	–	9,230 [d]	30,771	21,342	20,744	685	6,474
1977	112,722	–	63,120	262,854	–	11,385	58,275	2,204 [d]	10,734	610	677 [d]
1978	127,050	–	57,321	251,339	–	12,821	41,659	9,280 [d]	5,102	1,609	5,405
1979	66,471	–	43,391	81,830 [d]	280,537	1,506	35,598	10,962	14,221	1,025 [d]	3,060
1980	36,823 [d]	–	114,759	–	492,676	3,702 [d]	11,244 [d]	10,388	19,786	338	4,140
1981	81,555	147,312 [e]	–	–	1,486,182	14,348	–	–	–	3,500	8,500
1982	7,501 [d]	181,352 [e]	7,267 [d]	–	444,581	–	–	334 [d]	4,984 [d]	1,509	3,756
1983	–	110,608 [e]	–	–	362,912	1,263 [d]	19,749	2,356 [d]	28,141	1,097	716 [d]
1984	95,200 [d]	70,125 [e]	238,565	–	891,028	–	–	–	–	1,861	9,810
1985	66,146	–	52,750	–	1,080,243	10,494	19,344	13,232	22,566	1,005	3,178
1986	83,931	167,614 [f]	99,373	–	1,189,602	16,848	47,417	12,114	–	1,509	8,028
1987	6,687 [d]	45,221 [f]	35,535	–	455,876	4,094	7,163	2,123	5,869 [d]	333	3,657
1988	43,056	68,937 [f]	45,432	–	1,125,449	15,132	26,951	9,284	6,890	432	2,889 [d]
1989	21,460 [d]	–	–	–	636,906	–	–	–	–	714 [d]	1,574 [d]
1990	11,519 [d]	–	20,426 [d]	–	403,627	3,196 [d,g]	1,419 [d]	450 [d]	2,177 [d]	100 [d]	450 [d]
1991	31,886	–	46,657	–	847,772	13,150	12,491	7,003	9,947	10 [d]	154 [d]
1992 [n]	11,308 [d]	–	37,808 [d]	–	775,626	5,322	9,857	9,300	2,986	848 [d]	3,222
E.O.[h]	>109,000	–	>118,000	–	>500,000 [i]	–	>53,000 [k]	–	>17,000 [m]	–	>3,500

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Latest table revision November 18, 1992.
[b] From 1972–1979, counting tower operated; mainstem aerial survey counts below the tower were added to tower counts.
[c] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted.
[d] Incomplete survey and/or poor survey timing or conditions resulted in minimal or inaccurate count.
[e] Sonar count.
[f] Tower count.
[g] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.
[h] Interim escapement objective.
[i] The Anvik River Escapement Objective was rounded upward to 500,000 from 487,000 in March, 1992.
[k] Interim escapement objective for North Fork Nulato River only.
[m] Consists of Clear and Caribou Creeks interim escapement objectives of 9,000 and 8,000, respectively.
[n] Preliminary.

Table 16. Reported Yukon River fall chum salmon subsistence catches (assumed to include commercial rebated harvest to produce roe sold in the Upper Yukon Area) in numbers of fish by village, 1978 – 1991. [a]

Village	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Mouth to Anvik River														
Sheldon Pt.	0	1,072	1,249	490	886	233	655	713	259	882	209	586	102	84
Alakanuk	148	5,841	1,227	4,913	1,338	903	1,218	2,603	2,030	3,748	1,104	430	267	193
Emmonak	83	5,182	2,018	4,376	4,458	2,715	3,328	4,538	2,748	8,160	1,782	840	2,353	2,027
Kotlik	159	3,693	2,941	6,762	3,336	4,387	3,782	5,420	3,965	5,677	2,200	3,058	2,813	1,631
Personal Use										–	7	20	60	–
Subtotal	390	15,788	7,433	16,540	10,018	8,238	8,885	13,275	9,000	18,467	5,482	4,934	5,395	3,935
Anvik River to Owl Slough														
Mt. Village	558	5,144	5,719	3,794	2,810	4,065	3,497	3,591	2,947	4,897	1,860	4,641	1,568	1,473
Pilkas Pt. – St. Marys	311	3,528	3,268	3,322	2,386	3,138	3,927	3,315	5,401	3,966	2,533	1,970	958	2,202
Pilot Station	169	2,949	1,187	1,764	1,568	1,302	832	1,957	1,663	583	1,372	1,872	1,941	1,062
Marshall	241	3,040	2,261	2,990	2,747	1,836	3,136	2,681	3,472	4,008	2,815	1,532	1,724	691
Subtotal	1,297	14,662	12,435	11,770	9,511	10,341	11,394	11,544	13,483	13,454	8,600	10,015	6,187	5,428
Owl Slough to Bonasila R.														
Russian Mission	177	1,002	226	497	630	773	880	1,268	637	1,255	1,151	308	878	425
Holy Cross	89	1,441	2,094	2,396	1,029	2,090	1,373	1,024	1,148	1,598	596	711	1,178	190
Subtotal	266	2,443	2,320	2,893	1,659	2,863	2,233	2,290	1,785	2,853	1,747	1,019	2,056	615
Lower Yukon Total	1,953	32,893	22,188	30,203	21,188	21,442	22,512	27,109	24,268	34,774	15,829	15,968	13,638	10,178
Bonasila R. to Illinois Cr.														
Anvik	116	2,203	2,750	2,167	4,068	902	720	2,125	913	394	138	188	583	452
Grayling	459	2,199	1,904	880	2,972	3,847	1,950	3,106	4,204	4,760	1,760	830	1,405	3,816
Kaltag	1,149	8,464	2,111	2,329	812	2,833	1,330	1,570	2,024	7,474	2,293	1,654	2,327	2,834
Nulato	477	5,280	1,134	621	217	3,159	1,875	4,240	1,762	2,200	1,673	2,438	3,546	1,637
Koyukuk	411	4,515	2,319	700	1,355	1,120	1,560	798	2,195	2,492	587	2,460	860	2,761
Galena	3,013	2,597	2,852	3,142	2,184	4,259	7,270	4,476	4,819	10,509	4,308	6,436	3,202	5,525
Ruby–Kokrines	3,033	8,367	4,557	7,984	8,862	12,319	8,505	6,717	7,101	11,000	5,171	6,589	3,352	2,858
Subtotal	8,660	33,815	17,427	17,833	18,270	28,438	23,010	23,032	23,018	38,819	15,928	20,583	15,275	19,881

– Continued –

Table 16. (p. 2 of 2).

Village	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Illinois Cr. to U.S. Can. Border														
Tanana	12,882	32,842	32,834	30,820	31,470	41,630	42,690	28,113	32,049	41,825	55,998	40,845	41,145	40,868
Rampart	1,584	9,710	5,977	5,370	5,495	5,827	4,305	10,819	3,850	5,082	3,600	2,472	10,818	6,801
Fbks. Sub/Pers [b]	3,680	7,031	6,488	7,527	9,272	12,865	12,920	13,874	11,708	21,014	2,953	3,536	4,187	2,022
Stevens Village	4,947	4,125	3,233	8,356	7,392	3,502	4,932	11,879	4,150	7,538	1,451	6,633	3,857	2,481
Beaver	1,591	1,792	190	735	1,878	8,004	0	1,761	3,321	5,750	96	7,242	757	7
Ft. Yukon	18,932	21,467	8,537	16,143	1,928	3,967	7,525	12,718	8,543	15,200	2,766	27,790	11,827	7,467
Circle	820	3,108	1,737	6,219	290	3,887	3,107	4,006	3,850	7,891	4,396	4,478	7,814	6,340
Eagle	4,863	28,754	18,740	30,997	13,255	20,021	18,519	25,264	10,027	19,878	14,800	11,557	8,388	6,158
Subtotals	49,099	108,849	73,736	105,167	70,978	97,303	94,088	117,125	83,398	123,788	85,760	104,553	88,574	73,144
Shageluk														
Innoko River Subtotal				160		–	–	0	370	434	0	4	0	0
Koyukuk River														
Huslia	100	1,850	1,104	119	102	3,528	6,306	276	808	585	1,697	1,728	848	411
Hughes	175	1,201	2,265	611	1,231	327	1,280	1,260	1,422	586	311	260	70	270
Allakaket [e]	1717	1130	2879	1410	718	1915	556	707	878	1477	443	1969	3050	613
Subtotal	1,992	4,281	6,248	2,140	2,049	5,770	8,142	2,243	3,108	2,848	2,451	3,957	3,968	1,194
Tanana River														
Minto–Manley	10,820	18,855	17,153	12,801	8,012	17,889	8,221	11,202	6,450	9,666	9,514	23,082	35,685	18,519
Nenana [f]	19,255	29,430	29,742	10,176	9,034	11,685	13,520	22,901	15,902	26,908	26,869	25,340	13,956	17,832
Fairbanks [e]	682	3,481	3,433	3,865	2,518	2,600	2,985	2,860	2,803	3,319	2,230	12,219	4,072	4,018
Subtotal	30,857	51,766	50,328	26,832	19,564	32,174	22,726	36,963	25,155	39,911	38,633	60,851	53,713	40,369
Chandalar R. Subtotal	2,806	3943	2,730	6,400	850	7,800	4,345	–	4,728	5,460	1,102	10,977	6,867	858
Upper Yukon Total	82,814	166,511	150,469	158,322	111,711	171,486	152,311	179,363	139,775	211,060	143,874	200,725	168,395	135,346
Alaska Total	84,867	229,404	172,657	188,525	132,897	192,928	174,823	206,472	164,043	245,834	159,703	216,693	182,033	145,524
Old Crow Porcupine R.	5,000	11,000	6,000	3,000	3,459	3,100	6,230	3,500	700	4,024	3,302	5,471	6,085	4,014
Canada Total [d]	6,210	13,000	13,000	6,829	3,459	3,100	6,230	5,519	3,072	3,889	3,302	5,471	6,085	4,014
Total	101,077	242,404	185,657	195,354	136,356	196,028	181,053	211,991	167,115	249,723	163,005	222,164	188,118	149,538

[a] Catches reported in numbers of fish.
[b] Includes catches by Fairbanks subsistence and personal use permit holders that fished in Yukon River near the Haul Road bridge crossing.
[c] Alatna combined with Allakaket.
[d] Combined Indian Food Fish, Domestic and sport fish catch data by village obtained from annual management reports.
[e] Personal use catches included.
[f] Nenana includes Healy area subsistence catches.

Table 17. Fall chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1971 – 1992.[a]

Year	Toklat River[b]	Delta River[c]	Chandalar River[d]	Sheenjek River[d]	Fishing Branch River[e]	Canada Mainstem Tagging Estimate[f]
1971	–	–	–	–	312,800	–
1972	–	–	–	–	35,125 [g]	–
1973	–	–	–	–	15,989 [h]	–
1974	43,484	5,915	–	89,966 [i]	32,525 [h]	–
1975	90,984	3,734 [k]	–	173,371 [i]	353,282 [h]	–
1976	53,882	6,312 [k]	–	26,354 [i]	36,584	–
1977	36,462	16,876 [k]	–	45,544 [i]	88,400	–
1978	37,057	11,136	–	32,449 [i]	40,800	–
1979	179,627	8,355	–	91,372 [i]	119,898	–
1980	26,373	5,137	–	28,933 [i]	55,268	–
1981	15,775	23,508	–	74,560	57,388 [m]	–
1982	3,601	4,235	–	31,421	15,901	31,958
1983	20,807	7,705	–	49,392	27,200	90,875
1984	16,511	12,411	–	27,130	15,150	56,633 [n]
1985	22,805	17,276 [k]	–	152,768	56,016 [h]	62,010
1986	18,903	6,703 [k]	59,313	83,197	31,723 [h]	87,990
1987	22,141	21,180	52,416	140,086	48,956 [h]	80,778
1988	13,324	18,024	33,619	41,073	23,597 [h]	36,786
1989	30,447	21,342 [k]	69,161	101,748 [p]	43,834 [h]	35,750
1990	33,672	8,992 [k]	78,631	65,721 [q]	35,000 [q]	51,755
1991	13,197	32,905 [k]	–	90,000 [q]	37,733 [h]	78,461
1992 [r]	10,813	8,893	–	79,315	22,517 [h]	46,600
E.O.[s]	> 33,000	> 11,000	–	> 84,000 [t]	50,000 – 120,000	> 80,000

[a] Latest table revision November 18, 1992.
[b] Total escapement estimates using Delta River migratory time density curve and percentage of live salmon present by survey date in upper Toklat River area.
[c] Total escapement estimates made from migratory time density curve (see Barton 1986), unless otherwise indicated.
[d] Sonar estimate. From 1981 – 1985 sonar operations were initiated between August 29 and September 2. From 1986–1990 sonar operations were initiated between August 17 and August 25. For 1991 and 1992 sonar operations were initiated on August 9.
[e] Total escapement estimates using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.
[f] Excludes Fishing Branch River escapment (estimated border passage minus Canadian removal).
[g] Weir installed on September 22. Estimate consists of a wier count of 17,190 after September 22, and a tagging passage estimate of 17,935 prior to weir installation.
[h] Weir estimate.
[i] Total escapement estimates using sonar to aerial survey expansion factor of 2.221.
[k] Population estimate from replicate foot surveys and stream life data.
[m] Initial aerial survey count was doubled before applying the weir/aerial expansion factor of 2.72 since only half of the spawning area was surveyed.
[n] Escapement estimate based on mark–recapture program unavailable. Estimate based on assumed average exploitation rate.
[p] Includes a passage estimate of 20,000 salmon prior to initation of sonar–monitoring operations.
[q] Weir was not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approxiately 27,000 fish was made through date of survey, based upon historic average aerial–to–weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000 – 40,000 fish in view of aerial survey timing.
[r] Preliminary.
[s] Interim escapement objective.
[t] Based on escapement estimates for years 1974–1990.

Table 18. Coho salmon escapement counts for selected spawning areas in the Yukon River drainage, 1972–1992.[a]

Year	Andreafsky River		Anvik River	Kantishna River		Nenana River Drainage				Delta Clearwater River[d,f]	Clearwater Lake and Outlet	Richardson Clearwater River
	East Fork	West Fork		Geiger Creek	Barton Creek	Lost Slough	Nenana Mainstem[b]	Wood Creek[c]	17–Mile Slough			
1972	–	–	–	–	–	–	–	–	–	630	417	454 [e]
1973	–	–	–	–	–	–	–	–	–	3,322	551 [d]	375 [d]
1974	–	–	–	–	–	1,388	–	–	27	3,954	560	652 [d]
1975	–	–	–	–	–	943	–	–	956	5,100	1,575 [d,f]	4 [e]
1976	–	–	467 [e]	25 [h]	–	118	–	–	281	1,920	1,500 [d,f]	80 [e]
1977	–	–	81 [e]	60	–	524	–	310 [h]	1,167	4,793	730 [d,f]	327
1978	–	–	–	–	–	350	–	300 [h]	466	4,798	570 [d,f]	–
1979	–	–	–	–	–	227	–	–	1,987	8,970	1,015 [d,f]	372
1980	–	–	–	3 [h]	–	499	–	1,603 [h]	592	3,946	1,545 [d,f]	611
1981	1,657 [e]	–	–	–	–	274	–	849 [j]	1,005	8,563 [k]	459 [e]	550
1982	–	–	–	81 [h]	–	–	–	1,436 [j]	–	8,365 [k]	–	–
1983	–	–	–	42 [h]	–	766	–	1,044 [j]	103	8,019 [k]	253	88
1984	–	–	–	20	–	2,677	–	8,805 [j]	–	11,061	1,368	428
1985	–	–	–	42	–	1,584	–	3,775 [j]	2,081	5,358	750	–
1986	–	–	–	5 [h]	496	794	–	1,664 [j]	218 [e,f]	10,857	3,577	146 [e]
1987	–	–	–	1,175 [h]	–	2,511	–	2,450 [j]	3,802	22,300	4,225 [d,f]	–
1988	1,913	830	830	159 [h]	437	348	–	2,046 [j]	–	21,600	825 [d,f]	–
1989	–	–	–	155 [h]	12 [e]	–	–	412 [j]	824 [e]	11,000	1,600 [d,f]	483
1990	–	–	–	211 [h]	–	688	1,308	–	15 [e]	8,325	2,375 [d,f]	–
1991	–	–	–	427 [h]	467 [e]	564	447	–	52	23,900	3,150 [d,f]	–
1992 [m]	–	–	–	77 [h]	55 [e]	372	–	–	490	3,963	229 [d,f]	500 [d]

[a] Only peak counts presented. Survey rating is fair to good, unless otherwise noted. Latest table revision: November 16, 1992.
[b] Mainstem Nenana River between confluences of Lost Slough and Teklanika River.
[c] Surveyed by F.R.E.D.
[d] Surveyed by Sport Fish Division.
[e] Boat survey.
[f] Poor survey.
[h] Foot survey.
[j] Weir count.
[k] Population estimate.
[m] Preliminary

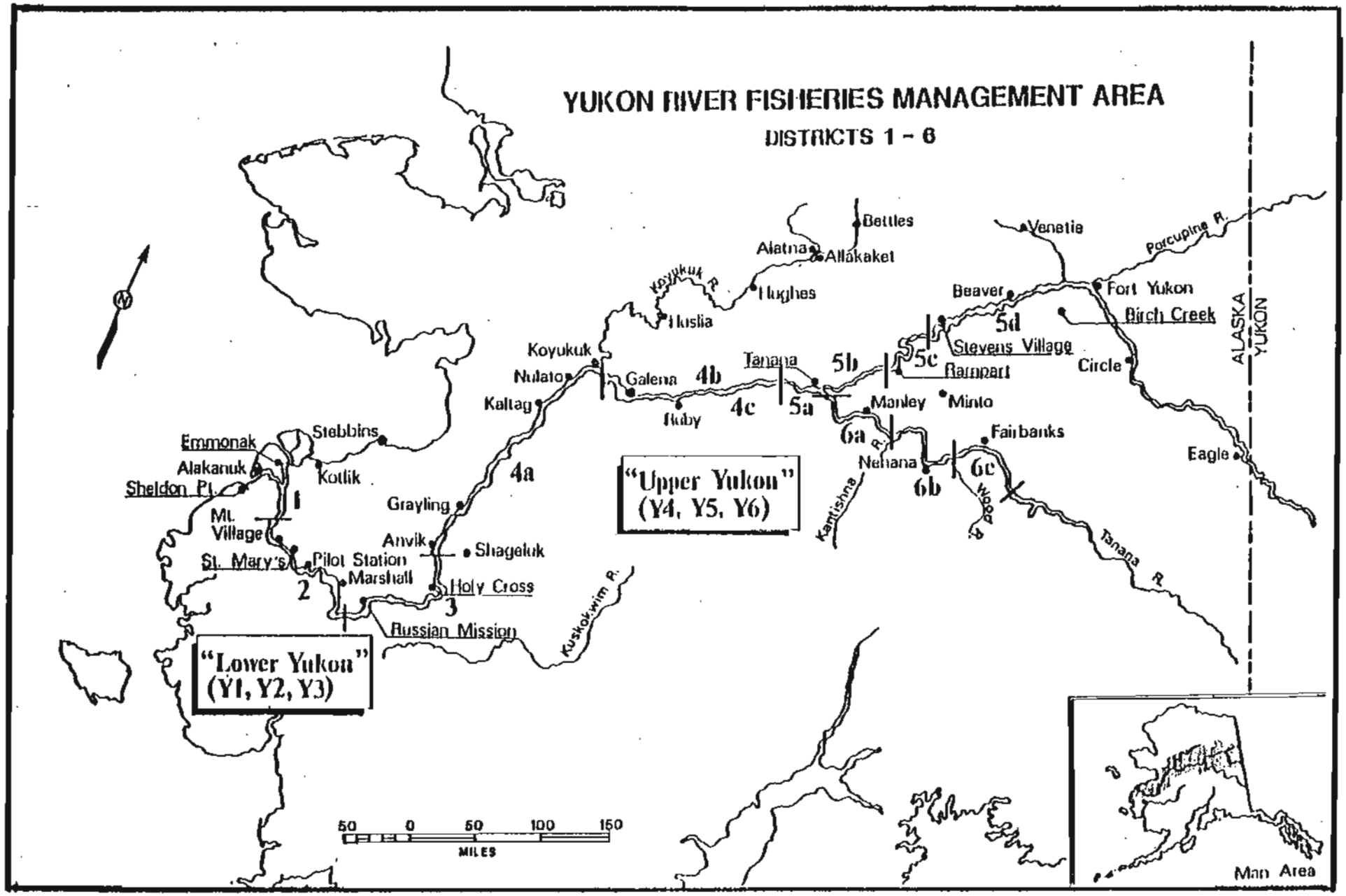

Figure 1. Yukon River drainage and management areas, Districts 1-6, Alaska.

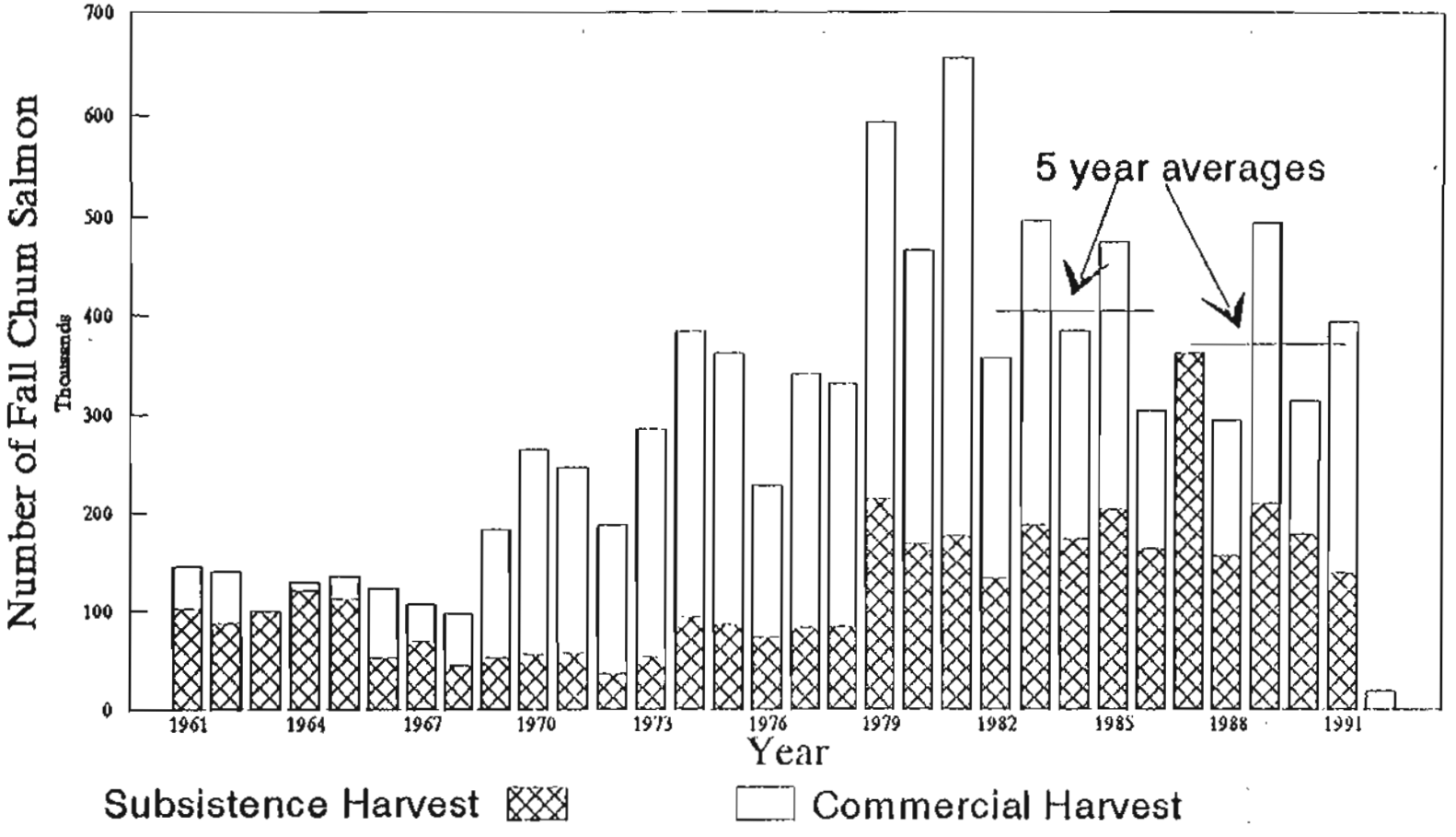

Figure 2. Alaskan harvest of fall chum salmon, Yukon River, 1961–1992.

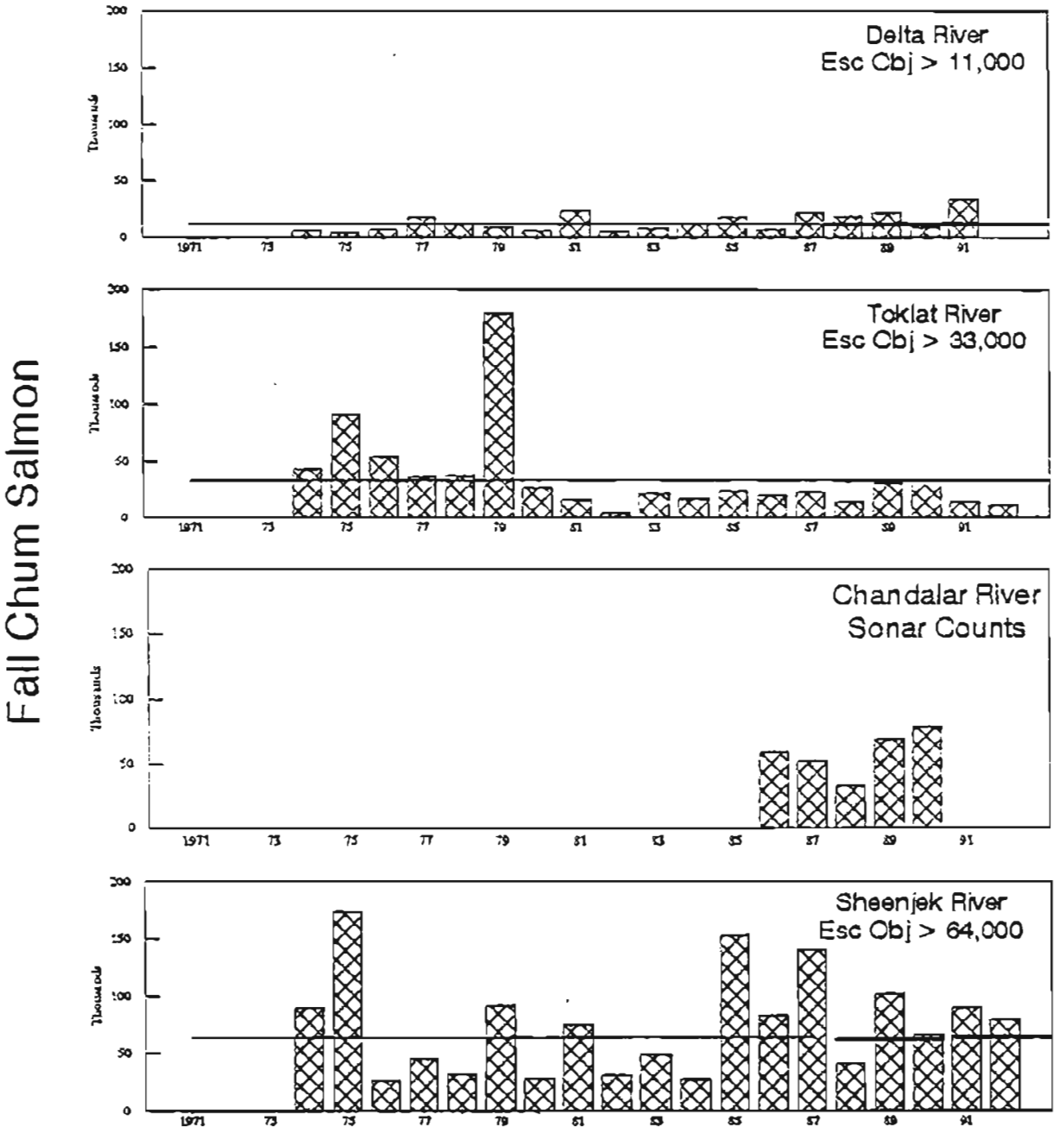

Figure 3. **Fall chum salmon escapement estimates for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1971–1992. Established interm escapement objectives are indicated for effective years by the dark horizontal lines. For years when no escapement objective was effective, the current interm escapement objective, represented by the light horizontal line, has been displayed for comparative purposes.**

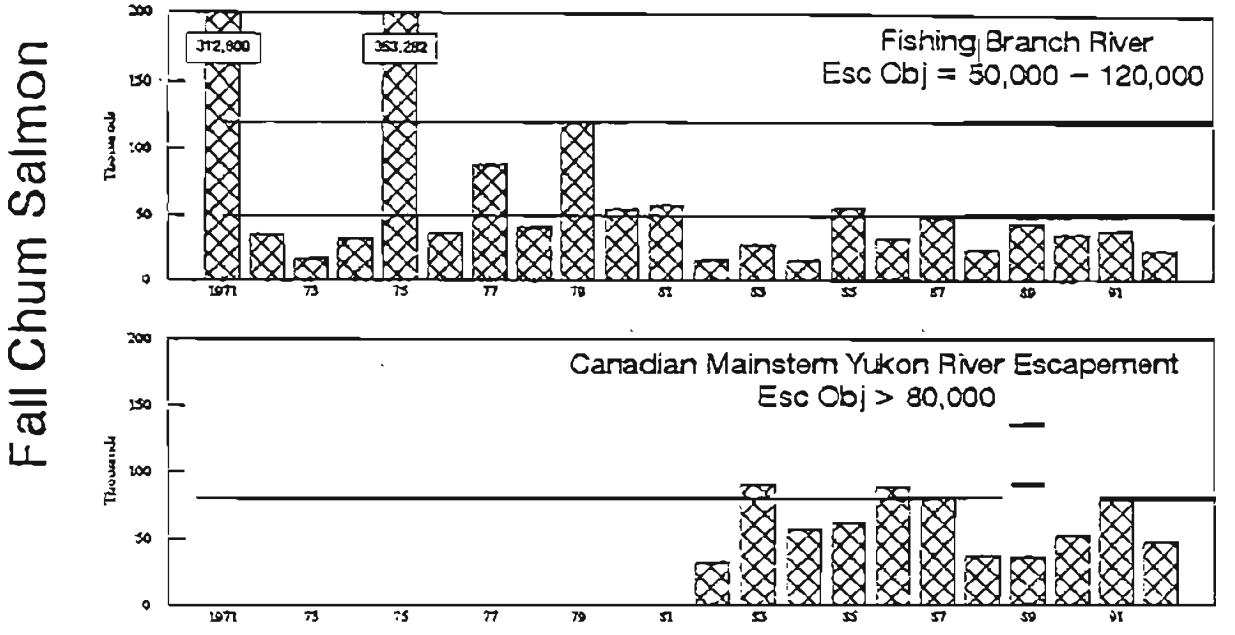

Figure 4. Fall chum salmon escapement estimates for spawning areas in the Canadian portion of the Yukon River drainage, 1971–1992. Established interm escapement objectives are indicated for effective years by the dark horizontal lines. For years when no escapement objective was effective, the current interm escapement objective, represented by the light horizontal line, has been displayed for comparative purposes.